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ACUTE PERFORATION OF PEPTIC ULCER

IMMEDIATE AND LATE RESULTS IN FIVE HUNDRED CASES

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LOS ANGELES

In the treatment of acute perforation of peptic ulcer neither the immediate nor the late results are wholly satisfactory. Immediate mortality is distressing and subsequent morbidity often embarrassing. Yet, considering the percentage of deaths when the condition is neglected, one is heartened by the fact that a majority of lives are saved by surgical treatment.

Immediate mortality in peptic ulcer complicated by acute perforation is dependent on many factors. The more important factors are not always under the control of the surgeon. Subsequent morbidity follows perforation largely because in most instances the risk to life is such as to prevent the surgeon's doing anything toward the cure of ulcer at the time of operation. Obviously if improvement in immediate and late results is to be obtained it must be accomplished through better control of the factors which affect morbidity and mortality. As surgeons, we must accept the challenge from the manifest need for improvement in end results.

LITERATURE

The literature on immediate results concerns itself chiefly with mortality and early symptomatic relief. The literature on late results revolves around the permanency of symptomatic relief and the further medical or surgical requirements of the patient. Published figures on mortality range all the way from 0 to 85.7 per cent, depending somewhat on the size of the series under discussion. For example, among Eliason and Ebeling's [1] collected cases there are seven reported series consisting of from six to twenty-two cases each in which there was no mortality. However, in eighteen series each consisting of 100 or more cases the mortality ranged from 12.9 to 38.8 per cent.

In 1908 Moynihan,[2] a pioneer in gastric surgery, reported a series of twenty-seven operations for perforation in which the mortality was 34 per cent. By 1928 his series had grown to 237 cases wherein the average mortality was 25 per cent. In Eliason and Ebeling's collected American series of 1,940 cases the mortality was 25.9 per cent, whereas in their European series of 3,121 cases the mortality was 22.6 per cent. The average mortality in 5,061 collected cases, therefore, was 23.9 per cent.

Other factors which play a part in mortality are the interval between perforation and operation and the type of operation performed. Storey [3] in 1936 reviewed a series of 261 cases in which the mortality ranged from 6.1 to 85.7 per cent, depending on the interval between perforation and operation. In a similar report by McCreery [4] in 1938 the mortality ranged from 4.3 to 80 per cent.

In 1924 Bundschuh [5] reported a small series of cases wherein mortality following conservative surgical treatment was 62.5 per cent whereas following radical pyloric resection it was only 16.6 per cent. Yudin [6] in 1937 reported 331 Billroth I and Polya pyloric resections with the remarkably low mortality of 7.8 per cent. In 1937 Shawan [7] reviewed 356 cases from the Detroit Receiving Hospital wherein the mortality ranged from 9.5 to 50 per cent with active treatment, depending on the type of operation employed.

Lewisohn [8] in 1928 reported failure to cure in 39 per cent of cases, and in 1929 Olson and Cable [9] found persistent symptoms in 10 to 67 per cent of cases, depending on the type of operation performed.

In 1932, Shelley [10] reported follow-up analysis of fifty-nine cases traced for from one to five years and found 67 per cent cures.

PRESENT SERIES OF CASES

This report is based on an analysis of 500 cases of acute perforation of peptic ulcer collected from the charity services of Los Angeles hospitals between Sept. 9, 1921, and June 30, 1934. Except for 1.8 per cent of cases in which the clinical diagnosis was correct beyond doubt, all the perforations were proved by operation or autopsy. This requirement of proof automatically excluded many cases in which the condition was clinically diagnosed and medically treated, especially those in which recovery took place. The mortality figures are affected accordingly.

Operations were performed by fifty-seven surgeons, with an average of 8.7 cases each. Such factors as site of perforation,[11] causes of death [12] and other clinical features [13] of the present series of cases are reported elsewhere.

Read before the Section on Surgery, General and Abdominal, at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 19, 1939.

1. Eliason, E. L., and Ebeling, W. W.: Am. J. Surg. **24**: 63-82 (April) 1934.
2. Moynihan, B. G. A.: Brit. M. J. **1**: 1092-1096, 1908; Practitioner **120**: 137-174 (March) 1928.
3. Storey, J. C.: M. J. Australia **1**: 52-59 (Jan 11) 1936.
4. McCreery, J. A.: Ann. Surg. **107**: 350-358 (March) 1938.
5. Bundschuh: Arch. f. klin. Chir. **129**: 281-296, 1924.
6. Yudin, S. S.: Surg., Gynec. & Obst. **64**: 63-68 (Jan.) 1937.
7. Shawan, H. K.: J. Michigan M. Soc. **36**: 629-632 (Sept.) 1937.
8. Lewischn, Richard: Ann. Surg. **87**: 855-860 (June) 1928.
9. Olson, F. A., and Cable, M. L.: Minn. Med. **12**: 468-478 (Aug.) 1929.
10. Shelley, H. J.: Am. J. Surg. **15**: 277-303 (Feb.) 1932.
11. Thompson, H. L.: Surg., Gynec. & Obst. **64**: 863-871 (May) 1937.
12. Thompson, H. L.: Proc. Second Cong. Pan-Pacific S. A., 1936, pp. 25-32.
13. Thompson, H. L.: California & West. Med. **44**: 469-474 (June) 1936.

IMMEDIATE RESULTS

Clinical Results.—According to the hospital records 206, or 41.2 per cent, of the patients were followed for periods ranging from a few weeks up to eighteen months (fig. 1). Among them 125, or 60.6 per cent, obtained complete relief after operation, whereas sixty-five, or 31.5 per cent, required medical treatment and sixteen, or 7.7 per cent, required further surgical treatment, as

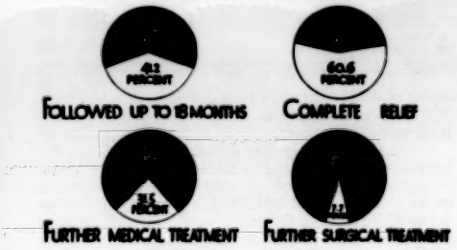

Fig. 1.—Immediate clinical results.

shown in the accompanying table. In seven cases, or 3.3 per cent, reperforation of peptic ulcer occurred, whereas in twelve, or 5.8 per cent, massive hemorrhage took place.

Of the cases in which further surgical treatment was required, gastrojejunostomy for obstruction was performed in eight, simple closure of reperforation and pylorectomy each were performed in two, whereas exploration, jejunostomy, pyloroplasty and sleeve resection were performed in one case each.

Gastrojejunal ulcer occurred in two of the cases in which gastrojejunostomy had been performed.

Gross Mortality.—Gross mortality, the mortality irrespective of the type, promptness or lack of treatment, includes the entire group of 500 cases (fig. 2). In this series 197 patients died, representing a gross mortality of 39.4 per cent. In 60.6 per cent of cases recovery took place.

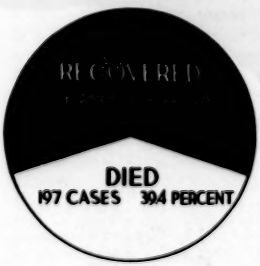

Fig. 2.—Gross mortality irrespective of surgical or expectant treatment.

Type of Treatment.—In seventy-six cases nonsurgical or expectant treatment was used (fig. 3). In this group there was only one recovery, which represents a mortality of 98.6 per cent. In 424 cases surgical treatment was used, with a mortality of 28.7 per cent. It is to be noted that between the two types of treatment the spread in mortality amounts to 70 per cent.

Interval.—The interval between perforation and operation long has been known as one of the most important factors which concern mortality and one which it is possible for the surgeon to control in only a portion of the cases. Generally it is taught that the mortality is directly proportional to the interval. That this is not always the case is shown by this study (fig. 4).

The cases are divided into four groups. In the first group the perforation had existed six hours or less; in the second, for seven to twelve hours; in the third, thirteen to twenty-four hours, and in the fourth, twenty-four hours or more. The first two groups comprise 130 and 168 cases, respectively. It is of interest to note that the figures for mortality in these two groups are within 0.5 per cent of each other, being 21.5 and 22 per cent, respectively.

Comparing the third group with the second, one finds a sharp rise in mortality to more than double when operation is delayed until the second twelve hour period. On the other hand, in the fourth group there is a reduction of mortality by 12 per cent among those whose operation was delayed for twenty-four hours or more. In view of the extremely high mortality in patients treated expectantly, I am sure no one would wait until the first twenty-four hours had elapsed to perform operation, other things being equal.

The most important point is that the lowest mortality occurs when operation is performed within the six hour period. However, it may be that sometimes operation had better be deferred, just as is the case in appendicitis.

Surgical Procedure.—The type of surgical procedure has a direct bearing on mortality (fig. 5). In 148 cases

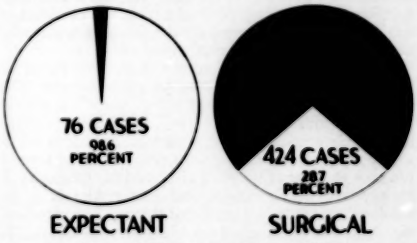

Fig. 3.—Relation of treatment to mortality.

wherein simple closure, that is, without suture of a tag of omentum over the perforation, was employed, the mortality was 34.4 per cent. In this connection it is highly important to note that in 242 cases wherein a tag of omentum was sutured over the perforation, the mortality fell off 10 per cent.

The Type of Operation Employed and the Complications Which Required Early Secondary Surgical Procedure in Sixteen Cases

Operation	No. of Cases	Complications	No. of Cases
Gastrojejunostomy	8	Hemorrhage	12
Simple suture	2	Obstruction	8
Pylorectomy	2	Reperforation	2
Pyloroplasty	1	Gastrojejunal ulcer	2
Jejunostomy	1		
Sleeve resection	1		
Exploration only	1		

In thirteen selected cases wherein some procedure was added to closure, such as gastrojejunostomy or pyloroplasty, there were not any deaths. Two things should be taken into account with regard to this group: first, that the series is small, and second, that the patients were selected for their good general condition before the additional procedure was begun.

Drainage.—As is well known, the recent tendency is in the direction of employment of less and less drainage in acute perforation of peptic ulcer, except perhaps when purulent peritonitis is present. In a small group of fifty-seven cases wherein drainage was not employed, the mortality was 14 per cent (fig. 6). In seventy-one cases wherein a single drain to the site of the ulcer was used, the mortality was 19.7 per cent. In seventy-five cases wherein a single drain elsewhere was used, the mortality was 32 per cent. In 208 cases drainage of multiple areas was attended by a mortality of 34.4 per cent. It seems fair to point out that in the cases wherein drainage was not employed, the general condition of the patients doubtless was better and the risk of operation less than in the others, particularly those in whom multiple areas were drained.

Anesthesia.—In this series of cases only four types of anesthesia were used, namely, ether (in some instances gas followed by ether), nitrous oxide alone, and spinal and local infiltration of procaine hydrochloride (fig. 7). In the first group there were 239 cases

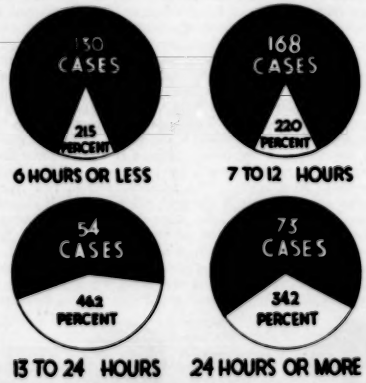

Fig. 4.—Relation of the interval between perforation and operation to mortality.

in which spinal anesthesia was used with sixty-five deaths, representing a mortality of 27.1 per cent. In the second group there were 145 cases in which ether was used with forty-one deaths, or a mortality of 28.5 per cent. In this group of eighteen cases in which nitrous oxide only was used the mortality was over 10 per cent higher, with seven deaths and 38.8 per cent mortality. In the group of seven cases in which local anesthesia alone was used there were six deaths, or a mortality of 90.7 per cent.

LATE RESULTS

Owing to the shift in population among persons who make up this series of cases late follow-up study was possible in only 10 per cent. However a group of fifty-one cases allows some interesting deductions (fig. 8). The time they were followed varied from three to fifteen years. It was five years or over in thirty-four cases, or 66 per cent; four years in thirteen cases, and three years in four cases.

Deaths.—Deaths were reported in two, or 3.9 per cent, of followed cases. One patient died in the same hospital fifteen years later, at which time mention of gastrointestinal trouble was not made on his clinical or autopsy records. The other patient was readmitted to the hospital a few months after operation with a diagnosis of senile psychosis, for which he was committed to a mental institution, from which he was reported to have died some months later.

Fig. 5.—Relation of surgical procedure to mortality.

Relief.—When it was asked if complete relief was obtained after operation the affirmative was reported in nineteen cases, or 38.7 per cent, whereas incomplete relief was secured in 61.2 per cent. However, it was stated that symptoms had not persisted or recurred in only twelve cases, or 24.4 per cent. Correlation between this opinion on the part of the patient and his report of persisting symptoms was not possible from the nature of these reports.

Subsequent Treatment.—Some type of subsequent therapeutic care was required in all but twelve cases. Self medication was sufficient in twenty, or 40.8 per cent, but the care of a physician was necessary in fifteen, or

Fig. 6.—Relation of drainage to mortality.

30.6 per cent. Only two patients had had further surgical treatment. One had had a gastrojejunostomy for obstruction. The other had been symptom free for ten years when hemorrhage occurred for which gastrojejunostomy subsequently was performed. However,

further surgical procedure was advised in two more cases; in one it was declined and in the other deferred because of arterial hypertension.

Disability.—Inability to work since operation was experienced in twenty-one cases, or 42.8 per cent. Disability was not experienced in twenty-eight, or 57.1 per cent.

COMMENT

The gross mortality reported in the present study in comparison with that of other reported series of cases is relatively high. This is partially explained by the fact that in over 98 per cent of cases the diagnosis of acute perforation was proved by operation or autopsy. Unless some such criterion of proof is established the inclusion of any considerable number of clinically diagnosed cases in a study of this subject will unavoidably admit cases of appendicitis, pancreatitis and cholecystitis. The results will be modified accordingly.

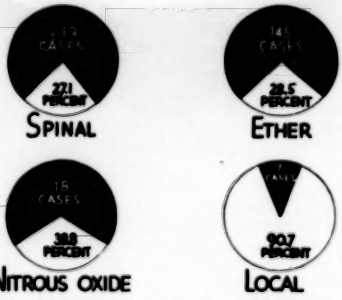

Fig. 7.—Relation of anesthesia to mortality.

For the same reason the mortality in the group of patients treated expectantly is extremely high. It is fair to point out that most of the patients in this group were moribund or beyond surgical aid when first seen. None of the patients in this group were treated by the continuous siphonage method. In the group treated surgically, on the other hand, the mortality compares favorably with that of other American series.

Regarding mortality with respect to anesthesia, it should be noted that in most of the cases wherein local infiltration of procaine hydrochloride was used the condition of the patient was so poor as to make the use of other methods of anesthesia objectionable. Spinal anesthesia was the most recent addition to anesthetic procedures, and it is quite possible that the patients in this group benefited also from other recent improvements in the handling of acute perforation of peptic ulcer.

While the group of cases on which the study of late results is based is not large, it represents the most important aspect of this study.

CONCLUSIONS

From this analysis of immediate and late results of treatment in acute perforation of peptic ulcer several conclusions may be drawn:

1. The gross mortality in cases of proved acute perforation of peptic ulcer is approximately 40 per cent.
2. Mortality may be materially lowered by the application of surgical treatment.
3. Mortality is lowest when operation is performed within six hours after perforation, when spinal anesthesia is used, when the operation consists of suture of a tag of omentum over the closed perforation and when drainage is not employed.
4. In approximately 40 per cent of cases continuation or resumption of treatment is required within five years, and in 10 per cent the treatment will be surgical.

1930 Wilshire Boulevard.

ABSTRACT OF DISCUSSION

DR. DAN C. DONALD, Birmingham, Ala.: Prompt surgery in acute perforated peptic ulcer stands out in the lead of all other factors governing the mortality rate. Among the surgical procedures, simple closure of the perforated ulcer by multiple interrupted sutures incorporating the omental tag is favored by the majority of statistics, with a death rate measured chiefly by the time interval (inception of perforation until patient reaches surgery). For late results, 39 per cent of the patients with perforated peptic ulcer following simple closure continue to have ulcer symptoms, and a small percentage of the ulcers will reperforate. In consideration of late symptoms and complications of reperforation, I feel that simple closure might be altered by pyloroplasty in the duodenal and pyloric ulcer, provided the duodenum is mobile and peritonitis is not present. Through pyloroplasty I have lowered the digestive complaints to 10 per cent and the mortality rate to as low as or lower than that following simple closure. Ninety per cent of perforated peptic ulcers occur near the pylorus, and the duodenal ulcer is ten to one greater than the gastric ulcer, and rarely is it more than 2 cm. from the pylorus. In pyloroplasty the ulcer-bearing tissue is excised in an elliptic manner along the course of the bowel, incision is carried through the pyloric ring on to the stomach for 4 cm. more and the opening is closed in transversely. The advantages from this type of operation are: the ulcer is removed, pyloric spasm is overcome and the opening between the stomach and the duodenum is enlarged, permitting a reflux of the alkaline secretions from the intestinal juices to aid in minimizing the acid chyme of the stomach. The keynote of success resulting from surgery in cases of perforated ulcer of the duodenum is to permit the stomach to drain by duodenal route rather than by gastrojejunostomy, wherein the gastric content with a high hydrochloric acid unit is permitted to flow into the jejunum, which is often followed by a marginal ulcer. Only in definite obstruction of the duodenal type of perforated ulcer should gastrojejunostomy be considered; such perforations are rare in this entity. In all acute attacks the perforated gastric ulcer should be excised by simple closure with interrupted sutures incorporating the omental tag.

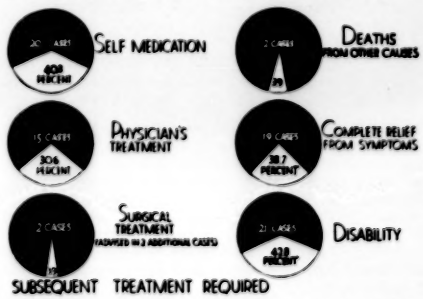

Fig. 8.—Late results in fifty-one cases followed from three to fifteen years.

DR. J. WILLIAM THOMPSON, St. Louis: We have made a clinical study of the results in the surgical treatment of perforated peptic ulcers at the St. Louis City Hospital. Our

series of 152 cases compares in many ways with that from the Los Angeles County Hospital. The diagnosis of perforated peptic ulcer is usually not difficult. Occasionally an acutely perforated ulcer is confused with acute appendicitis. We take roentgenograms of the chest and abdomen as a routine in order to reveal the presence of air under the right leaf of the diaphragm. I believe that this is a most important procedure and should be used a great deal more frequently, especially in making a differential diagnosis in doubtful cases. Our investigations show no seasonal variation in the incidence of perforation. The mortality rate in perforated ulcer goes up tremendously in patients past the age of 60. Therefore it is important to consider surgical treatment of peptic ulcers in patients past middle age. Peptic ulcer is an extremely common disease, and familiarity should not breed contempt leading to overprolonged medical treatment. Ulcers on the gastric side of the pyloric sphincter are frequently malignant, no matter what size, and therefore should be operated on when there is the slightest doubt as to the exact nature of the lesion. In this way a few patients will be prevented from dying from complications of perforation. The procedures used in our series are essentially the same. Most of them were simple closures, and the results are better in those cases in which this method was used. The mortality rate was 25 per cent, a little lower than that of Dr. H. L. Thompson. A policy of doing more extensive operations such as pyloroplasty and gastro-enterostomy, I think, should be frowned on. In an exceptional case they are occasionally justifiable.

DR. CHARLES BROWN ODOM, New Orleans: Dr. DeBakey has reviewed 211 cases admitted to Charity Hospital in New Orleans during the last ten years. It has been recognized that the incidence of peptic ulcer is increasing. However, the frequency of acute perforation is becoming disproportionately greater. Although the percentage of ulcers per hundred thousand admissions increased from 0.0444 in 1929 to 0.0614 in 1938, comparable figures for acute perforations were 0.0139 and 0.0782. Contrary to the general impression that perforated ulcer occurs rarely in Negroes, race incidence in our series revealed almost equal frequency: 128 (60.6 per cent) white and 83 (39.3 per cent) Negro patients. Basing these respective incidences on corresponding hundred thousand admissions, these figures are 0.0403 and 0.0364 per cent. There was no significant seasonal variation in our cases. A review of more than 15,000 cases reported in the literature revealed variations too wide to be significant. Mortality incidence in this series was found to depend on several factors, one of the most important being the number of hours after the perforation. All cases that were not proved perforations were disregarded. In eighty-two cases operation was performed within six hours with nine deaths, a mortality of 10.9 per cent; sixty-six cases within twelve hours with ten deaths, a 15.1 per cent mortality; nineteen cases within eighteen hours with five deaths, a higher mortality. After twenty-four hours there were nine deaths in nineteen cases, or 47.3 per cent. I don't believe one can treat perforated peptic ulcer any other way than by surgery. I think that Dr. Thompson's figure after the twenty-four hour period is misleading. The type of operation was another factor in the mortality rate: in 200 cases treatment was by simple closure with thirty-three deaths. With other operative procedures the mortality rate immediately increased. In seven cases in which other procedures were used three deaths occurred. The anesthetic was another factor in mortality. I believe that block anesthesia is the best anesthesia to use in these cases. Whereas of seven cases in which epidural block and 154 cases in which spinal anesthesia were used, the mortality incidences were 0 and 15.7 per cent respectively; of forty-three cases in which general anesthesia and five cases in which local analgesia were employed, the respective death rates were 22.7 per cent and 60 per cent.

DR. HAROLD LINCOLN THOMPSON, Los Angeles: The etiology, pathology and diagnosis in this group of cases have been studied statistically and are reported elsewhere. I believe that one can approach the truth in this condition only when a large series of cases is considered. I know of no other way to smooth out the marked variations that are found in reports on smaller groups of cases. I hope to make a report on a more recent series of 500 cases in the near future. I should like to call attention again to the fact that these were proved perforations. This authentication is the only means by which to approach accuracy in a study of this kind. Regarding spinal anesthesia, it is possible, since the spinal method is the most recent addition to our methods of anesthesia, that the patients in this group also benefited by other recent technical improvements in treatment.

NEUROLOGIC ASPECTS OF HERNIATED NUCLEUS PULPOSUS

AT THE FOURTH AND FIFTH LUMBAR INTERSPACES

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As recently as a year ago it was considered imperative to confirm any presumptive diagnosis of herniated nucleus pulposus of the lower lumbar intervertebral disks by roentgenologic examination of the spinal canal after injection of some contrast medium.[1] However, even a year ago in cases of severe, persistent sciatic pain associated with pain low in the back and rigidity, together with hypesthesia of the lateral aspect of the involved leg and diminution of the ankle jerk, surgical exploration gave positive results regardless of the type of defect demonstrated with iodized oil. Conversely, all too frequently in cases of what were thought to be characteristic defects demonstrable with iodized oil but in which the neurologic evidence was less characteristic, exploration gave negative results. On the basis of our experience with a series of eighty-five low intraspinal lesions treated surgically we shall present what we have found to be the characteristic clinical picture of herniated nucleus pulposus at the fourth and fifth lumbar interspaces.

The term "herniated nucleus pulposus" is used in preference to "protruded intervertebral disk" because disease of the disk is rarely responsible for nerve root compression except when the annulus fibrosus has ruptured and allowed the nucleus pulposus to extrude through the defect.

It must be emphasized in the beginning that the history and neurologic signs of herniated nucleus pulposus are not peculiar to this one clinicopathologic entity. Neoplasm along the course of the sciatic nerve, rectal or pelvic disease and disease of the osseous structures must be ruled out by regional and roentgenologic examinations before the clinical diagnosis of herniated nucleus pulposus can be made.

ANATOMIC CONSIDERATIONS

It is necessary to review the structure and innervation of the lower lumbar region to obtain a better understanding of the symptoms and signs of herniated nucleus pulposus. The relations between the fifth lumbar nerve and the disk between the fourth and fifth lumbar vertebrae and between the first sacral nerve and the lumbosacral disk are especially important, since in more

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1. Love, J. G., and Walsh, Maurice: Protruded Intervertebral Disks: Report of 100 Cases in Which Operation Was Performed, J. A. M. A. **111**: 396 (July 30) 1938. Spurling, R. Glen, and Bradford, F. Keith: Low Intraspinal Lesions as a Cause of Back and Sciatic Pain, J. Med. **19**: 598 (Feb.) 1939. Bell, J. C., and Spurling, R. Glen: Concerning the Diagnosis of Lesions in the Lower Spinal Canal, Radiology **31**: 473 (Oct.) 1938.

than 90 per cent of the cases herniated nucleus pulposus occurs at these levels.

The spinal cord usually terminates opposite the intervertebral disk below the first lumbar vertebra. The nerve roots forming the cauda equina are freely movable in the large lumbar canal except as they approach their exits, where they are fixed. It is therefore apparent that displacement of the roots is possible, except near the port of exit, without neurologic deficit.

At the intervertebral disk between the fourth and fifth lumbar vertebrae (hereafter the fourth lumbar disk) the fifth lumbar nerve is contained in the subarachnoid space, fixed laterally against the dura one vertebra higher than its exit. The dural sleeve of the fifth lumbar nerve emerges below the fourth lumbar disk and passes downward beneath the pedicle of the fifth lumbar vertebra to its intervertebral foramen. This relation holds between all the lumbar nerves and their respective disks. In contrast, the dural sleeve of the first sacral nerve separates from the thecal sac above the lumbosacral disk and can thus be compressed without deforming the sac.

It is unnecessary to repeat the description of the intervertebral disk, so well presented by Maurice.[2] However, the innervation of the annulus fibrosus and the posterior longitudinal ligament which reenforces it has received scant attention.

Each of the spinal nerves gives rise to a recurrent branch just distal to the posterior root ganglion, which reenters the intervertebral foramen and supplies the ligamentous structures two vertebrae lower than the exit of the spinal nerve (fig. 1). Roofe's[3] recent studies indicate that there is a profuse supply of sensory nerve endings in the annulus fibrosus and the posterior longitudinal ligament. This anatomic observation sheds much light on the symptoms both in cases in which the disease is limited to the ligamentous structures of the lower lumbar and lumbosacral regions

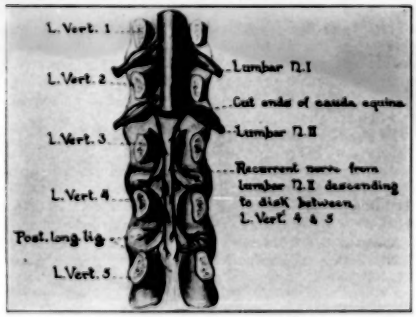

Fig. 1.—Distribution of the second recurrent lumbar nerve to the region of the third and fourth lumbar vertebrae and the fourth and fifth intervertebral disks.

and in cases in which a tear of the annulus fibrosus has led to herniation of the nucleus pulposus.

It is apparent from the relations indicated that knowledge of the exact distribution of the fifth lumbar and first and second sacral nerves, motor and sensory, is essential to a proper clinical understanding (figs. 2, 3, 4). In herniated nucleus pulposus the usual finding of hypesthesia or anesthesia of the lateral aspect of the leg probably depends on the combined involvement of the dermatomes of the fifth lumbar and first sacral or the first and second sacral nerves, since the involvement of a single spinal nerve rarely gives objective sensory evidence. However, paresthesias may result from the involvement of a single spinal nerve. The dermatome of the fifth lumbar nerve is small, but its loss, with associated loss of the first sacral nerve, would probably give an area of hypesthesia on the anterolateral aspect of the leg. Similarly, both the first and the second sacral nerves would necessarily be affected if hypesthesia or anesthesia of the more lateral aspect of the leg was produced. The small gluteal dermatomes are rarely of clinical importance.

Fig. 2.—Approximate dermatome of the fifth lumbar root: *A*, ventral view; *B*, dorsal view; *C*, lateral view. (Figures 2, 3 and 4 are modified from illustrations in Tilney, Frederick, and Riley, H. A.: The Form and Functions of the Central Nervous System, New York, Paul B. Hoeber, Inc., 1938.)

CLINICAL CONSIDERATIONS

Symptoms.—Discussion of the symptoms will be limited to those resulting from herniation of the nucleus pulposus at the fourth lumbar and lumbosacral disks.

The occurrence of severe, persistent sciatic pain is of greatest importance diagnostically, especially if it is exaggerated by coughing, sneezing or straining. The pain may not be uniform along the course of the nerve. Points of greatest intensity are likely to be in the gluteal region, the posterior aspect of the thigh, the back of the knee or the lateral aspect of the leg or ankle. Coughing, straining or sneezing may exaggerate the pain in only one place and may do so only transiently. In almost every case, however, incapacitating pain low in the back precedes the sciatic pain by weeks, months or years. In the absence of a definite history of trauma, the onset of acute pain in the back is usually associated with lifting in a bent forward position or with sudden torsion of the trunk. Frequently the pain at the time of injury is slight, becoming severe after several hours or days. The pain low in the back is variable or intermittent and is usually intensified by bending or lifting. Whether unilateral or bilateral, the main feature is its mechanical nature, its elicitation or aggravation by certain postures or movements. Additional trauma may precede extension of the pain along the course of the sciatic nerve. At this time the back pain may be an insignificant part of the clinical picture although usually present to a considerable degree.

Paresthesias are of extreme importance, being of far more localizing value than is the distribution of pain. Tingling, prickling, cold or numb sensations occurring below the knee in the lateral aspect of the leg or in the foot are characteristic of herniated nucleus pulposus at the fourth or fifth lumbar interspace.

Weakness is not usually a major complaint, being confused with the disability from pain unless a particular palsy is present, such as foot drop.

Signs.—The stiff lumbar spine is a prominent clinical feature, but not as important diagnostically as the severe sciatic pain with a positive Lasègue sign, the hypesthesia of the foot and lateral aspect of the leg and the diminution or absence of the ankle jerk.

2. Maurice, G.: Le disque intervertébral, Paris Thesis, 1933.
3. Roofe, Paul G.: Unpublished observations.

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Patients with herniated nucleus pulposus at the fourth or fifth lumbar disk exhibit much the same appearance of the lumbar spine as patients with other severe articular disease of this region. This part of the spine is usually straight, with spasm of the erector spinae muscles, especially on bending forward. Listing to one side is common, with the ilium usually higher on the affected side. Limitation of flexion of the lumbar spine is marked in all patients in whom pain in the back is conspicuous and present to some degree in the remainder.

As Lasègue [4] pointed out, many patients with severe sciatic pain keep the knee flexed and are unwilling to put the heel to the floor, thus preventing direct tension on the sciatic nerve. The test that bears his name accurately differentiates the patients with painful hamstring muscles from those with lesions affecting the components of the sciatic nerve. It is performed with the patient supine. The thigh is raised to right angles with the trunk, and the leg, which has remained flexed, is extended on the thigh until pain begins along the course of the sciatic nerve. Without further movement of the leg or thigh, the foot is passively dorsiflexed to determine whether this additional pull on the sciatic nerve exaggerates the pain. The results are positive in all cases of lateral herniation of the nucleus pulposus.

Occasionally, pressure directly or laterally on the spinous processes of the fourth and fifth lumbar vertebrae or pressure just lateral to the spines over the lumbar muscles will elicit pain in the distribution of the sciatic nerve. If present, this sign is highly indicative of herniated nucleus pulposus.

In a moderate percentage of patients with pain on coughing or sneezing, sustained pressure over both internal jugular veins reproduces or exaggerates the sciatic pain. This, a positive Naffziger [5] reaction, is pathognomonic of intraspinal disease.

Tests of the motor power are usually not of much aid. Patients confuse pain on using the affected part with weakness, and testing is unsatisfactory because of the pain on exertion of motor power. However, occasionally definite paresis or paralysis of the anterior tibial, peroneal, extensor hallucis or extensor digitorum

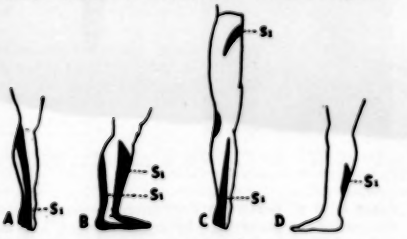

Fig. 3.—Approximate dermatome of the first sacral root: *A*, ventral view; *B*, lateral view; *C*, dorsal view; *D*, mesial view.

communis muscles is seen. Fibrillation of muscles of the leg is also seen in some cases. Much more important is diminution or absence of the ankle jerk, which usually occurs with herniation at the lumbosacral disk.

The sensory changes are most important in making the diagnosis. Whether the herniation is at the fourth lumbar or the lumbosacral disk, the lateral aspect of the leg will be hypesthetic in most cases. However, herniation at the fourth lumbar disk (involvement of the fifth lumbar and first sacral nerves) usually results in hypesthesia of the anterolateral aspect of the leg with inclusion of the great toe (figs. 2 and 3), while herniation at the lumbosacral disk (involvement of the first and second sacral nerves) gives hypesthesia of the

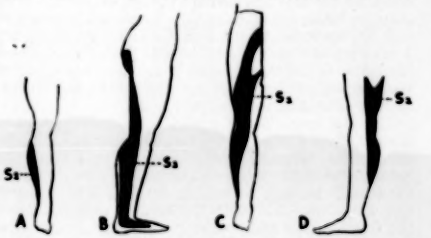

Fig. 4.—Approximate dermatome of the second sacral root. *A*, ventral view; *B*, lateral view; *C*, dorsal view; *D*, mesial view.

posterolateral aspect of the leg with inclusion of the lateral aspect of the foot (figs. 3 and 4). Sensory changes may also extend to the posterior aspect of the thigh and the saddle region on one side, but, as a rule, no diminution is observed above the knee. Although the areas of hypesthesia can usually be determined with pinprick, testing with cotton wool or hot and cold test tubes frequently reveals a definite area of hypesthesia where results with pinprick were equivocal. Stimulation of the hypesthetic zone may produce typical causalgic pain, limited to the area involved. The causalgia may overshadow the hypesthesia.

Patients with herniation of the nucleus pulposus at the fourth lumbar and the lumbosacral disk have in common pain low in the back, severe sciatic pain, and hypesthesia or anesthesia below the knee. If the ankle jerk is unchanged and paresthesia or hypesthesia in the leg is more anterior, including the great toe, the fourth lumbar disk is more likely involved. If the ankle jerk is diminished or absent and the hypesthesia is more posterolateral, including the lateral aspect of the foot, the herniation is probably at the lumbosacral disk.

COMMENT

The recurrent episodes of pain low in the back which usually precede the sciatic pain of herniated nucleus pulposus are due to disease of the intervertebral disks and posterior longitudinal ligament. Tearing of these structures may result from frank trauma or as a result of "wear and tear" on already degenerated structures. The annulus fibrosus and posterior longitudinal ligament are innervated by the recurrent branches of the lumbar nerves. Pain predominates locally with perhaps some spread to the gluteal regions or upper posterior aspect of the thighs. But true sciatic pain is not caused by involvement of the ligamentous structures alone. Many patients with ligamentous injuries probably recover without herniated nucleus pulposus developing beneath the nerve roots. It must be remembered that if the nucleus pulposus extrudes through the annulus fibrosus without causing nerve compression the lesion remains in the category of purely ligamentous injury.

However, in patients with disease of the annulus fibrosus, herniation is likely to occur in a posterolateral direction because of the poor lateral development of the posterior longitudinal ligament which reenforces the

4. Lasègue, Ernst-Charles: Consideration sur la sciatique, Arch. gén. de méd. **2**:558, 1864.
5. Naffziger, H. C., and Jones, O. W.: Dermoid Tumors of the Spinal Cord, Arch. Neurol. & Psychiat. **33**:941 (May) 1935.

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annulus fibrosus. At the fourth lumbar disk such a posterolateral herniation compresses primarily the fifth lumbar nerve just above its exit through the dural sleeve. If it extends far laterally, it can and does, rarely, compress the fourth lumbar nerve in its foramen. If it extends medially, compressing the thecal sac from the side, in addition to the fifth lumbar nerve, it will compress the first and perhaps the second sacral nerve, only displacing the other roots, whose fixation points of exit are lower or on the opposite side. At either the fourth lumbar or the lumbosacral disk an occasional herniation is sufficiently large to compress a number of roots against the ligamentum flavum or the lamina, thereby producing more diffuse signs.

The first sacral nerve can be compressed by such a posterolateral herniation without any indentation of the dura mater, since its dural sleeve emerges above the lumbosacral disk. Although herniation rarely extends far enough laterally to involve the fifth lumbar nerve, this can occur. Far more common is compression of the dural sac in addition to compression of the first sacral root, with resulting involvement of the second and perhaps the third, fourth and fifth sacral roots.

It is the compression of one or more of these components of the sciatic nerve which gives rise to the severe "sciatica." From involvement of either the fifth lumbar or the first sacral root alone, pain can occur along the course of the entire nerve. The sensory as well as the motor innervation of the glutei, hamstrings and leg muscles is contributed to by both these nerves, which explains pain in these muscles. The absence of pain in the iliopsoas, quadriceps femoris and adductors is explained by their higher segmental innervation.

Although pain does occur in the dermatomes of the involved spinal nerves, it is more often lacking. Paresthesias are far more frequent and important in accurate clinical localization especially when coupled with objective sensory signs. Only in exceptional instances is paresthesia or hypesthesia of the gluteal portions of the dermatomes of the fifth lumbar and first and second sacral nerves observed.

The usual absence of involvement of the ankle jerk in herniation at the fourth lumbar disk (involvement of the fifth lumbar nerve) and diminution (involvement of the first sacral nerve) or absence (involvement of the first and second sacral nerves) in herniations at the lumbosacral disk are in keeping with the accepted innervation of the gastrocnemius and soleus muscles by the first and second sacral nerves. Confusing is the fact that these muscles have rarely been found weak and never paralyzed in cases of herniation of the nucleus pulposus.

That these neurologic symptoms and signs are accurate and reliable is attested by the fact that during the past three months we have successfully removed nine consecutive herniations of the nucleus pulposus without confirmation with iodized oil or other contrast mediums. In the same three months iodized oil was used six times, with indication for operation in but two instances. Even in these two cases the clinical evidence pointed with reasonable certainty to the location of the lesion, but as compensation was involved in both cases verification with iodized oil was deemed advisable. The present high incidence of positive results of exploration, in contrast to our earlier results,[6] we owe chiefly to the increased understanding of the neurologic picture.

6. Bradford, F. Keith, and Spurling, R. Glen: Intraspinal Causes of Low Back and Sciatic Pain: Results in Sixty Consecutive Low Lumbar Laminectomies, Surg., Gynec. & Obst., to be published.

SUMMARY

1. Although herniated nucleus pulposus of the fourth lumbar and the lumbosacral disk has long appeared to give an unorthodox neurologic picture, a more thorough experience with this lesion has made possible accurate diagnosis from clinical evidence alone in the majority of instances.

2. The neurologic signs of herniated nucleus pulposus are not peculiar to this clinical entity, since neoplasm along the course of the sciatic nerve, pelvic and rectal disease and disease of the osseous structures may simulate the clinical picture.

Brown Building.

THE DIAGNOSIS OF INTERVERTEBRAL DISK PROTRUSION BY INTRASPINAL INJECTION OF AIR

AIR MYELOGRAPHY

W. EDWARD CHAMBERLAIN, M.D.
AND
BARTON R. YOUNG, M.D.
PHILADELPHIA

Air or oxygen serves as an excellent contrast medium in the spinal canal for visualization of a protruded intervertebral disk or any other space-taking lesion. We have used gaseous contrast mediums as a routine for the past three and one-half years with all patients who have had sufficient symptoms and neurologic evidence to make us suspect an intraspinal lesion.[1] Our experience, based on more than 300 spinograms, indicates that the method is accurate and reliable, as in each case in which operation was performed the exact level of the lesion determined by myelographic examination was verified by laminectomy. The procedure is harmless, so negative results cause no feeling of apprehension as to unpleasant or dangerous sequelae, such as might develop if the contrast medium were an unabsorbable substance.

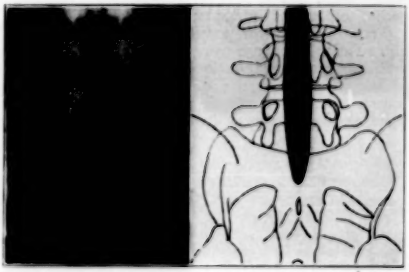

Fig. 1.—Normal lumbocaudal sac. Note the sharp definition of the lateral margins of the sac as seen on the anteroposterior projection with the patient in the Trendelenburg position.

The use of air in the spinal canal was suggested by Dandy[2] in 1918, but only in recent years has it been possible to obtain sufficient contrast and detail in roentgenograms to utilize gaseous contrast mediums.

From the Department of Radiology, Temple University School of Medicine.
Read before the Section on Radiology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 18, 1939.

1. We have used oxygen as a routine for more than a year because it is absorbed faster than air and produces less discomfort.

2. Dandy, W. E.: Ann. Surg. 68:5 (July) 1918.

In 1934 Coggeshall and von Storch [3] showed that the lumbocaudal sac could be visualized by air, but their report was limited to the results with three normal patients. The same year Van Wagenen [4] reported three cases of complete spinal block in which the lower level of the lesion was visualized by injection of small amounts of air. During the past year we and our associates have reported our use of myelographic examination with air and oxygen in a number of articles.[5]

The technic of injection varies somewhat, depending on the level of the lesion. If a lesion is suspected below the third lumbar vertebra, the patient is placed in a lateral decubitus position, with the head of the table lowered to an angle of from 20 to 25 degrees. An 18 or 20 gage spinal needle is inserted into the subarachnoid space at the second lumbar interspace, and spinal fluid and air are exchanged in 5 cc. quantities until air escapes through the needle. Usually it takes from 40 to 50 cc. to fill the lumbocaudal sac in the adult (fig. 1). In case the clinical evidence places the lesion above the third lumbar vertebra, the spinal needle is inserted in the third lumbar interspace with the patient in a horizontal position and a Queckenstedt test is done. If this

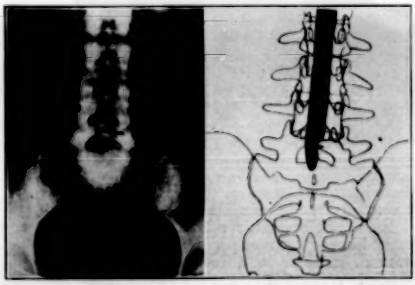

Fig. 2.—Unilateral marginal indentation at the fifth lumbar interspace due to a protruded intervertebral disk. A hypertrophied ligamentum flavum may produce a similar defect. There were complete disappearance of the pain and restitution of function after removal of the disk.

test shows a partial or complete block, from 3 to 6 cc. of spinal fluid is carefully replaced by an equal amount of air so that the spinal fluid pressure is kept as constant as possible. The patient is then placed in the sitting posture with his back against a Potter-Bucky diaphragm for the roentgenograms.

If the Queckenstedt test is negative, the dorsal sac can be visualized by replacement of spinal fluid with air by either lumbar or cisternal puncture. Nearly all our patients had air introduced after lumbar puncture because we are especially interested in the lumbocaudal sac and have examined this area as a routine (even though the signs pointed to a lesion in the dorsal region) in order to obtain normal standards. If the lumbocaudal sac is well filled there will be sufficient air for visualization of the dorsal sac, but in order to get the air into the dorsal region the patient is turned face down and the table changed from the Trendelenburg to the horizontal position. To visualize the subarachnoid space in the cervical region it is necessary to do either cisternal puncture with the patient in the Trendelenburg position or lumbar puncture with complete drainage of the cerebrospinal fluid as in encephalography.

Visualization of air in the spinal canal depends on roentgenograms of good contrast and detail. We have found that "overexposed" films give us more informa-

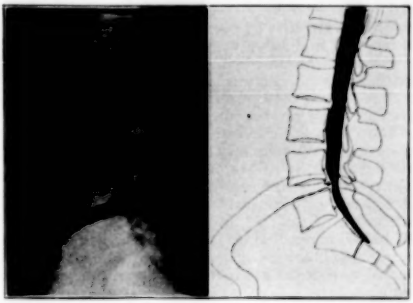

Fig. 3.—Normal posterior bulging of the ventral limiting membrane of the lumbocaudal sac seen opposite each intervertebral disk when the patient is in hyperextension. Hyperflexion produces flattening or straightening of this ventral membrane.

tion, so we raise the kilovoltage from 8 to 10 above that necessary for spinal detail. An ordinary horizontal x-ray table equipped with a Potter-Bucky diaphragm is used and, in order to get the necessary Trendelenburg position, one end is elevated by a chair or blocks. The minimal film requirements in the lumbar region are stereoscopic lateral and anteroposterior projections. When the interest is centered in the upper dorsal or cervical region, it is advisable to take stereoscopic oblique projections as well as the lateral ones, because

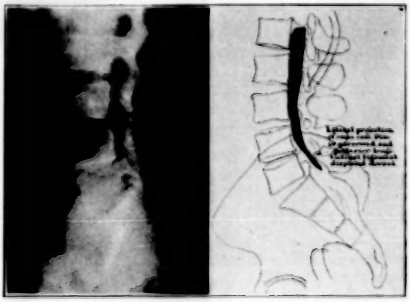

Fig. 4.—Displacement of the posterior longitudinal ligament dorsad by a herniated intervertebral disk at the fourth lumbar interspace. (Compare with the normal configuration of fig. 3.) Note the narrowing of the interspace. At operation the sac below the protruded disk was almost obliterated by the resultant arachnoiditis.

the superposed shadow of air in the trachea often interferes with interpretation. The normal dorsal curve will cause the air to remain below the fourth or fifth dorsal segment, so the upper part of the thorax should be elevated by small pillows or sand bags under the shoulders, but the head must be lower than the air column or air will ascend into the cranium and produce headache.

3. Coggeshall, H. C., and von Storch, T. J. C.: Diagnostic Value of Myelographic Studies of the Caudal Dural Sac, Arch. Neurol. & Psychiat. **31**: 611 (March) 1934.
4. Van Wagenen, W. P.: Ann. Surg. **99**: 939-943 (June) 1934.
5. Scott, Michael, and Young, B. R.: Air Myelography in the Diagnosis of Lesions of the Spinal Canal, Arch. Neurol. & Psychiat. **38**: 1126 (Nov.) 1937; Am. J. Roentgenol. **39**: 187 (Feb.) 1938; Confinia Neurologica, to be published. Chamberlain, W. E., and Young, B. R.: Radiology, to be published.

We have been interested in the effects of hyperflexion and hyperextension on the configuration of the ventral limiting membrane of the lumbocaudal sac. For this reason, as a routine we make additional stereoscopic lateral projections of the lumbar region in these special positions. In every normal case the maneuver of hyperflexion is seen to flatten the contours of the ventral surface of the sac, while hyperextension produces plainly visible bulging of soft tissue contours into the canal opposite each intervertebral disk. In a few cases of intervertebral disk protrusion we have obtained some evidence of accentuation of the disturbance during extension of the spine and partial reduction of the protrusion during flexion. Further studies along these lines are being carried out.

The diagnosis of a herniated disk depends in most cases on the indentation or encroachment of the limiting membrane of the subarachnoid space. The one exception to this is seen when the disk has produced a complete block of the canal and, if this is the case, the inferior margin of the disk is easily demarcated by the air bubble trapped under it (fig. 5). A herniated disk nearly always carries the posterior longitudinal ligament dorsad so that the indentation of the ventral aspect of the air column is usually detected on the lateral projections (fig. 3). Commonly the defect is noted at the level of the interspace, but if the protrusion is marked the ventral limiting membrane of the canal will be pushed dorsad for a variable distance below the interspace (fig. 4). The indentation of the air column due to a herniated disk is not always seen on the lateral projections. In a number of cases the defect was visualized only on the anteroposterior projections as a bilateral waistlike constriction or a unilateral marginal indentation (fig. 5).

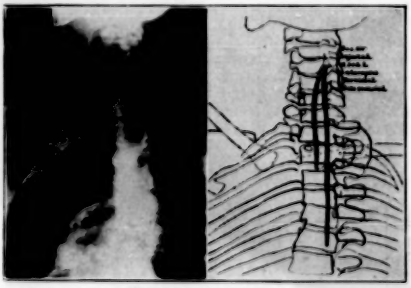

Fig. 5.—Herniated intervertebral disk producing incomplete block of the subarachnoid space at the fourth cervical segment. Three cc. of air trapped under the disk revealed its level. The disk was removed at laminectomy. The roentgenograms were taken immediately after the patient was placed in an upright sitting position.

SUMMARY AND CONCLUSIONS

Myelographic examination with air is a reliable and harmless method of visualizing herniated intervertebral disks and other space-taking lesions in the spinal canal. The success of the method depends on proper technic of air injection and roentgenograms of good contrast and detail. We have had experience with more than 300 spinograms for which air or oxygen was the contrast medium. We consider the method reliable because in every case in which operation was performed the level of the lesion predicted after myelographic examination was verified at laminectomy. Air studies have not been misleading, as there were no instances in which the myelograms indicated a lesion without verification at operation.

A major advantage of air and oxygen as contrast mediums for myelographic examination is the fact that their use does not entail leaving unabsorbable and possibly irritating substances in the spinal canal. Even those who believe that iodized oil is not contraindicated for myelographic examination tend to reserve its use to cases in which laminectomy is practically assured at the time of the study. Because air and oxygen are completely absorbed from the subarachnoid space (oxygen more promptly than air) there will be less hesitancy about subjecting patients to myelographic examination with such a contrast medium.

THE ROENTGENOLOGIC DIAGNOSIS OF INTRASPINAL PROTRUSION OF INTERVERTEBRAL DISKS

BY MEANS OF RADIOPAQUE OIL

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Since Mixter and Barr [1] in 1934 emphasized the significance of intraspinal protrusion of the intervertebral disks as an important cause of low back pain and sciatica, this condition has aroused no little interest. During the past few years considerable literature concerning the subject has appeared and the condition has been firmly established as a definite clinical and pathologic entity. Pathologic studies of a large series of protruded intervertebral disks by Deucher and Love [2] indicate that the protruded fragments are composed of fibrocartilage, portions of the nucleus pulposus and occasionally remnants of the notochord. These structures are not ordinarily opaque to roentgen rays and cannot be demonstrated per se in plain roentgenograms. Bone or calcium in quantities gross enough to be revealed roentgenographically is so rare in these protrusions that it is of little practical diagnostic importance.

For this reason the roentgenologist is dependent on the use of some contrast agent for the indirect visualization of the protrusion. Several contrast agents, that is, iodized poppyseed oil,[3] air [4] or oxygen, skiodan,[5] and colloidal thorium dioxide,[6] have been employed for visualization of the spinal subarachnoid space. Each of these substances has certain advantages and disadvantages. None of them so far have proved ideal and sooner or later a nonirritating radiopaque agent that can be absorbed and eliminated through the spinal fluid will be developed. Such a substance should do much to expand the usefulness of roentgenologic procedures in the study of neurologic conditions.

To date iodized oil has been used more than any other contrast agent for the roentgenologic visualization of

From the Section on Roentgenology, the Mayo Clinic.
Read before the Section on Radiology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 17, 1939.

1. Mixter, W. J., and Barr, J. S.: Rupture of the Intervertebral Disk with Involvement of the Spinal Canal, New England J. Med. **211**: 210-215 (Aug. 2) 1934.
2. Deucher, W. G., and Love, J. G.: Pathologic Aspects of Posterior Protrusion of the Intervertebral Disks, Arch. Path. **27**: 201-211 (Feb.) 1939.
3. Sicard, J. A., and Forestier, J.: Méthode générale d'exploration radiologique par l'huile iodée (lipiodol), Bull. et mém. Soc. méd. d. hôp. de Paris **1**: 463-469 (March 17) 1922.
4. Dandy, W. E.: Roentgenography of the Brain After the Injection of Air into the Spinal Canal, Ann. Surg. **70**: 397-403 (Oct.) 1919.
5. Arnell, S., and Lidström, F.: Myelography with Skiodan (Abradil), Acta radiol. **12**: 287-288, 1931.
6. Radovici, A., and Meller, O.: Encéphalo-myélographie par le thorotrast sous-arachnoïdien et épidural: Recherches expérimentales, Compt. rend. Soc. de biol. **109**: 1382-1384 (May 6) 1932.

the spinal subarachnoid space and when employed under proper circumstances it has resulted in an accuracy of diagnosis that is shared by few other roentgenologic procedures. The chief objection to the use of iodized oil is that it is more or less of an irritant to the meninges and is contraindicated in the presence of inflammatory disease. The significance of the irritative action has been discussed pro and con in the literature for some years but nevertheless it is the consensus of observers who have used it in a large number of cases that in properly selected cases the advantages of its use far outweigh any disadvantages that are known.

Fig. 1.—Protruded lumbosacral intervertebral disk. Classic unilateral deformity of iodized oil shadow.

I have had no experience with the use of colloidal thorium dioxide for visualization of the subarachnoid space. It is very irritating to the cerebral meninges, especially the ependyma, and it is very probable that it has the same effect on the spinal meninges. The fact that it is radioactive and has not been accepted by the Council on Pharmacy and Chemistry of the American Medical Association makes it a drug to be used with considerable discretion despite its desirability from the standpoint of radiopacity alone.

The use of air or oxygen for the study of the spinal subarachnoid space has been revived in recent years and this procedure has much in its favor.[7] On the other hand there are certain decided disadvantages. In the first place, because of the difficulty in controlling the position and distribution of the air (or oxygen) its use with any satisfaction is restricted to the lumbar canal. Secondly, the accuracy of the diagnosis with air is not equal to that attained with iodized oil. My own experience with the use of air as a substitute for iodized oil in the case of lesions associated with low back pain or sciatic pain indicates that iodized oil is more accurate, that it will reveal certain structures not demonstrated with air, and that it has localized lesions that air has failed to disclose. There is no doubt that air will reveal some lesions very satisfactorily and can be used in many instances before iodized oil is resorted to. However, the results of such an examination following the use of air should be carefully appraised by the clinician in view of the limitations of its accuracy.

INDICATIONS FOR THE USE OF IODIZED OIL

The indiscriminate use of iodized oil in cases of low back or sciatic pain is not recommended. No contrast agent should be used unless the clinical and neurologic examination indicates the possible presence of an intraspinal lesion that cannot be localized by ordinary clinical procedures. Increasing familiarity with the history and neurologic examination in cases of protruded intervertebral disks indicates that in a fair proportion of cases the diagnosis and localization of the protrusion can be made clinically without resorting to any contrast agent.[8] With this improvement in clinical diagnostic acumen the necessity for the use of a contrast agent will probably diminish and be reserved for those cases in which the diagnosis is in doubt and those in which it is desirable to establish a very precise anatomic level of the lesion for the guidance of the neurosurgeon.

If the suspected level of a lesion is at the conus or above, experience indicates that the use of air or oxygen will not be helpful unless obstruction of the subarachnoid space has occurred. This results from the fact that air or oxygen is very difficult to hold in position in the thoracic or cervical portion of the spinal canal, and their use in these regions is further complicated by the superimposition of the shadow of air in the trachea, larynx and pharynx, which renders the interpretation of resulting shadows exceedingly difficult or impossible. Iodized oil, therefore, is the medium of choice for the demonstration of lesions at or above the conus.

Statistics indicate that the great majority of protruded intervertebral disks occur in the lumbar and lumbosacral regions where they are accessible to examination by either air or iodized oil.[9] Since there is a reasonable chance that the protrusions may be disclosed by air or oxygen, it is probably good judgment to attempt their localization by this means before iodized oil is resorted to. If the air studies are inconclusive or unsatisfactory, iodized oil may then be used. If the air studies are negative and the history and neurologic examination are suggestive of the presence of a protruded disk, iodized oil should be used to check the spinogram. When the air studies reveal either a deformity that will not account for the patient's symptoms or a lesion the level of which is not compatible with the symptoms, the results should be confirmed with iodized oil before laminectomy is advised.

Multiple Protruded Intervertebral Disks

Affected Disks	Number of Cases
Fifth and fourth lumbar	6
Fourth and third lumbar	14
Third and second lumbar	1
First lumbar and twelfth thoracic	1
Twelfth and eleventh thoracic	1
Eleventh dorsal and fifth lumbar	1
Third, fourth and fifth lumbar	1
Second, third and fourth lumbar	1
Eleventh dorsal, fifth lumbar and tenth dorsal	1
Total	27

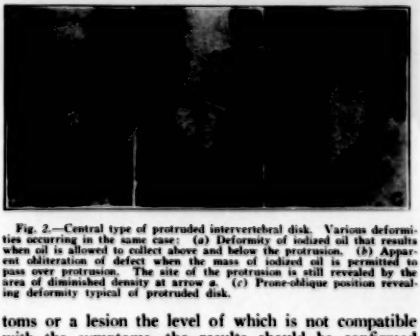

Fig. 2.—Central type of protruded intervertebral disk. Various deformities occurring in the same case: (a) Deformity of iodized oil that results when oil is allowed to collect above and below the protrusion. (b) Apparent obliteration of defect when the mass of iodized oil is permitted to pass over protrusion. The site of the protrusion is still revealed by the area of diminished density at arrow a. (c) Prone-oblique position revealing deformity typical of protruded disk.

AMOUNT OF IODIZED OIL

It is well known that small amounts of iodized oil (from 0.2 to 2 cc.) will localize the site of completely

7. Young, B. R., and Scott, Michael: Air Myelography: The Substitution of Air for Lipiodol in Roentgen Visualization of Tumors and Other Structures in the Spinal Canal, Am. J. Roentgenol. 39: 187-192 (Feb.) 1938.

8. Craig, W. McK., and Walsh, M. N.: The Diagnosis and Treatment of Low Back and Sciatic Pain Caused by Protruded Intervertebral Disk and Hypertrophied Ligaments, Minnesota Med. 22: 511-517 (Aug.) 1939.

9. Camp, J. D., and Addington, E. A.: Intraspinal Lesions Associated with Low Back Pain and Their Localization by Means of Lipiodol Within the Subarachnoid Space, Radiology, to be published.

obstructing lesions, but the neurologic examination in these cases usually gives such results that nowadays the level can be established without the use of iodized oil. In the interest of early diagnosis and for the localization of lesions before obstruction has occurred, it is necessary to use a quantity of iodized oil sufficient to fill the subarachnoid space completely at any desired level. For several years I have advocated the use of 5 cc. of iodized oil because I have found from previous experience with smaller amounts that this is the optimal volume for accurate and consistent localization of nonobstructing lesions.[10] Some lesions can be shown with lesser quantities but on the other hand a number of surprisingly large lesions and particularly multiple lesions are easily overlooked if amounts less than 5 cc. are used. The majority of protruded intervertebral disks do not produce obstruction and 12 per cent of protruded intervertebral disks in my experience have been

Fig. 3.—Protruded intervertebral disk. Bilateral type of iodized oil deformity.

Fig. 4.—Primary hypertrophy of the ligamentum flavum without associated protrusion of the intervertebral disk; (a) lateral view revealing broad indentation on posterior aspect of column of iodized oil characteristic of hypertrophied ligamentum flavum; (b) anteroposterior view revealing broad bilateral indentation of iodized oil shadow resulting from hypertrophy of the ligamentum flavum. The deformity is more marked on the left side.

multiple, as shown in the table. For this reason I still believe that 5 cc. of iodized oil is the optimal amount to use for the demonstration of protruded disks even though the majority occur in a region of the spinal column that is easily examined. In my experience, reactions following the injection of 5 cc. have been no greater than those observed with 2 cc.

TECHNIC OF INJECTION

The lumbar injection of iodized oil is preferred because it is easier and safer to carry out than cisternal puncture and will facilitate the keeping of the oil together as one mass in the lower part of the spinal column—a point that is very important for the demonstration of small lesions. It is important that the iodized oil used be clear, transparent and only faintly yellow. Oil that is brownish should be discarded, since this indicates deterioration and the presence of free iodine, which is undesirable. Prior to injection the ampule is warmed to a temperature of 105 F., which will increase the fluidity of the oil and facilitate its injection. If the

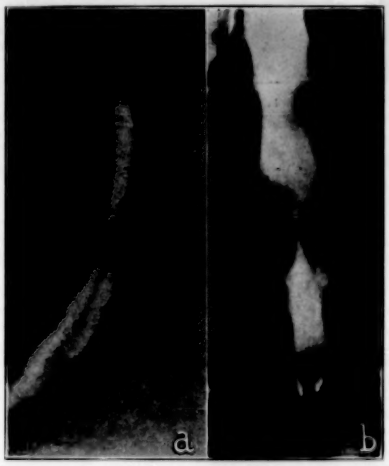

Fig. 5.—Protruded intervertebral disk between fourth and fifth lumbar vertebrae and associated hypertrophy of the ligamentum flavum. Characteristic deformity of iodized oil: (a) Lateral view. Iodized oil shadow is indented anteriorly by the protruded intervertebral disk and posteriorly by the hypertrophied ligamentum flavum. (b) Anteroposterior view. Note broad extent of deformity corresponding to site of ligamentum flavum.

injection is made with slow continuous pressure on the syringe, droplet formation within the subarachnoid space will be avoided.

ROENTGENOLOGIC TECHNIC

It is desirable that the roentgenologic study be carried out as soon after the injection as possible, as delayed examination and movements of the patient may lead to separation of the mass of oil and droplet formation. A tilting fluoroscopic table with appropriate foot and shoulder rests is necessary for the roentgenologic examination. Some method of quickly recording the fluoroscopic image on films is highly desirable. If a spot film device is not available, excellent films may be made by sliding a cassette under the fluoroscopic screen, delimiting the area by the fluoroscopic shutters and changing from fluoroscopic to radiographic technic by means of a quick change-over switch on the control panel. In addition to localized "spot" films of the lesion, a large film revealing several contiguous vertebrae is

10. Camp, J. D.; Adson, A. W., and Shugrue, J. J.: Roentgenographic Findings Associated with Tumors of the Spinal Column, Spinal Cord and Associated Tissues, Am. J. Cancer **17**: 348-372 (Feb.) 1933. Camp, J. D.: Multiple Tumors Within the Spinal Canal: Diagnosis by Means of Lipiodol Injected into the Subarachnoid Space (Myelography), Am. J. Roentgenol. **36**: 775-781 (Dec.) 1936.

necessary in order to establish the anatomic level accurately. This is extremely important when surgical intervention is contemplated, because congenital variations at the lumbosacral junction or the presence of additional lumbar vertebrae may easily mislead the surgeon when counting spinous processes to determine the site for laminectomy.

The details concerning the actual technic of the roentgenologic examination for determining the presence of a protruded intervertebral disk have been published previously and will not be repeated here.[11] If the result of the examination of the lumbar spinal subarachnoid space is negative, I believe that it is important to examine the subarachnoid space higher up, as recent observations[9] have revealed that 50 per cent of patients with tumors of the spinal cord located in the thoracic region and 30 per cent of patients with such tumors located in the cervical region have low back or sciatic pain or both as an associated or coincident symptom. Quantities of iodized oil less than 5 cc. are not practical for this phase of the examination because smaller masses of oil are rapidly diminished in size by the droplets that normally separate out and lag behind as the oil moves cephalad through the thoracic region. The quantity thus remaining for study of the upper thoracic and cervical regions is totally insufficient to portray even a large protruded disk.

Fig. 6.—Protruded intervertebral disk between fourth and fifth lumbar vertebrae. Iodized oil deformity is on the right side. Defect due to edema of affected nerve root and obliteration of usual shadow of nerve sleeve is indicated by arrow. Note normal shadow of nerve sleeve on opposite side.

ROENTGENOLOGIC CHARACTERISTICS OF PROTRUDED INTERVERTEBRAL DISKS

The deformity of the iodized oil shadow resulting from a protruded intervertebral disk is influenced by the following factors: (1) the position of the protrusion, (2) size of the protrusion, (3) associated hypertrophy of the ligamentum flavum, (4) changes in the nerve roots (displacement, edema, nonfilling of affected nerve root sleeve) and (5) anatomic variations of the cul-de-sac.

Position of the Protrusion.—Except in very unusual cases the protruded fragment is situated in the anterior portion of the spinal canal and will produce its maximal effect on the column of iodized oil when the patient is lying in a prone or prone-oblique position. Since the majority of protruded intervertebral disks present on one side of the median line, the classic defect is a sharply defined unilateral rounded indentation of the iodized oil shadow opposite an intervertebral disk (fig. 1). It occurs in about 65 per cent of cases. Midline protrusions when of moderate size may produce only a central defect. They are most obvious when some of the oil is allowed to accumulate just above and just below the lesion (fig. 2 *a*). When the table is elevated and a large quantity of iodized oil is permitted to flow over the point of maximal protrusion, the central defect may appear to be obliterated and convey the erroneous impression that the region is normal (fig. 2 *b*). Repeated observations at the site of such lesions will reveal that the central defect will reappear whenever the oil is allowed to move slowly away from the protrusion and uncover the "hump" produced by the lesion. In the prone-oblique or lateral position the defect of a central protrusion will be quite obvious and the shadow of the iodized oil that passes over the peak of the protrusion will be clearly defined (fig. 2 *c*). Large central protrusions are easily recognized because the deformity that they produce cannot be effaced regardless of the amount of iodized oil at the site of the lesion. Partial obstruction is common in large central lesions.

Size of the Protrusion.—The extent of the iodized oil defect is influenced naturally by the size of the protrusion. Any deformity to be of diagnostic significance must be persistent, although the extent of the deformity may be somewhat influenced by the volume of iodized oil at the site of the lesion. In contrast to central protrusions, unilateral lesions are usually most obvious when a large mass of oil is present about it. Except as the iodized oil deformity may be influenced by the presence of associated hypertrophy of the ligamentum flavum, the larger the protrusion the greater the obstruction of the subarachnoid space will be. Partial obstruction occurs in about 11 per cent of cases and complete obstruction in only about 2.5 per cent of cases. The larger the protrusion the greater the tendency to produce a bilateral deformity, which occurs in about 35 per cent of cases (fig. 3). The presence or absence of a bilateral deformity is also influenced considerably by the presence or absence of hypertrophy of the ligamentum flavum.

Fig. 7.—Protruded intervertebral disk between second and third lumbar vertebrae. Complete obstruction of iodized oil. *a*, shadow of edematous right second lumbar root, which is compressed by protrusion.

Hypertrophy of the Ligamentum Flavum.—This condition has been found frequently by neurosurgeons in conjunction with a protruded intervertebral disk. It generally occurs at the same level as the protrusion but may occasionally be found at other interspaces. Localized hypertrophy of the ligamentum flavum without coincident protrusion of a disk is not common, but when it does occur it may imitate all the clinical phenomena of a protruded intervertebral disk. Normally the ligamentum flavum forms the posterior boundary of the intervertebral foramen and extends posteriorly on each side to the midline, thus enclosing the spinal canal between the laminae.

11. Camp, J. D.: Roentgenologic Findings in Cases of Protruded Intervertebral Disks, Proc. Staff Meet., Mayo Clin. **12**: 373-377 (June 16) 1937. Love, J. G., and Camp, J. D.: Root Pain Resulting from Intraspinal Protrusion of Intervertebral Disks: Diagnosis and Surgical Treatment, J. Bone & Joint Surg. **19**: 776-804 (July) 1937.

Because of the anatomic location of the ligamentum flavum, this structure when it hypertrophies will compress the column of iodized oil posteriorly and laterally. Hypertrophy of the ligamentum flavum, when it occurs without associated protrusion of an intervertebral disk, is characterized in the lateral view by a broad or rounded indentation on the posterior aspect of the column of iodized oil between contiguous laminae[9] (fig. 4*a*). In the prone or supine position the hypertrophy may be portrayed by broad indentation of the column of iodized oil, sometimes unilateral but generally bilateral (fig. 4*b*).

Fig. 8.—Protruded lumbosacral intervertebral disk. Iodized oil reveals narrow cul-de-sac and also slight indentation on right side at site of protrusion.

There is no constant relation between the degree of hypertrophy of the ligamentum flavum and the size of the associated protruded intervertebral disk. It is not uncommon to find a marked hypertrophy of the ligamentum flavum in association with a moderate protrusion of the disk, and under such circumstances the defect produced by the ligamentum flavum is the predominant part of the visible deformity. Because of the size and extent of the normal ligamentum flavum, the iodized oil deformity that results when it hypertrophies will extend over a longer area than that occupied by the contiguous intervertebral space and the area occupied by a protruded disk unless the disk fragment is unusually large. Early in this work, before the significance of hypertrophy of the ligamentum flavum was recognized, it was sometimes difficult to reconcile the large iodized oil deformity in certain cases with the small protruded disk that was found at operation. It is now clear that the defect was largely the result of a hypertrophied ligament, the deformity of which was not recognized.

When considerable hypertrophy of the ligamentum flavum accompanies a large protruded disk, the iodized oil defect is characteristic. The mass of iodized oil is compressed between the protruded disk anteriorly and the hypertrophied ligamentum flavum posteriorly and laterally. The resultant deformity is shown in figure 5*a* and *b*. The narrow streak of iodized oil in the midline represents the small quantity of oil that remains beneath the angle posteriorly where the right and left halves of the ligament meet. The upper and lower limits of the defect are sharply defined owing to the termination of the ligamentum flavum along its point of insertion on the contiguous laminae.

Changes in the Shadows of Nerve Roots.—The shadows of nerve roots composing the cauda equina are frequently visualized in the roentgenograms that are made during the course of the study with iodized oil. In about one third of the cases of protruded intervertebral disk, lateral or posterior displacement of the nerve root shadows or both will be visible at the site of the protrusion. The presence of such changes is helpful in supporting a diagnosis of protruded intervertebral disk when the other iodized oil appearances are atypical or are minimal in extent.

Edema of Contiguous Nerve Roots.—The significant symptoms of a protruded disk are the result of pressure exerted on the nerve roots by the protruded fragments. Edema of an affected nerve root may result in three ways: (1) by irritation of the root as it passes over the protruded disk, (2) by compression of the root between a protruded disk and the contiguous pedicle of the vertebra or (3) by compression of the root between a protruded disk and a hypertrophied ligamentum flavum either within the spinal canal or at the point of emergence through the intervertebral foramen. In the latter case pressure on the nerve is further increased by narrowing of the intervertebral foramen, which results from the hypertrophied ligamentum flavum which forms its posterior boundary. The edematous nerve root will displace additional iodized oil at the site of protrusion and correspondingly increase the deformity. An early change resulting from edema of a nerve root is obliteration of the usual shadow of the nerve sleeve where the root passes through the dura (fig. 6). In some cases the shadow of an edematous nerve root may extend one or more segments above the level of the protrusion (fig. 7).

anomalies of the terminal portion of the cul-de-sac, which occur in about 5 per cent of cases, may complicate the roentgenologic diagnosis of a protruded

Anatomic Variations of the Cul-de-Sac.—Two lumbosacral intervertebral disk. The first of these is an anomaly in which the cul-de-sac terminates at the usual site about the level of the second sacral segment but is considerably narrower than normal below the level of the fourth lumbar intervertebral space (fig. 8). In such a case a moderate protrusion of a lumbosacral disk may be present without deforming the iodized oil in the narrow subarachnoid space and a large protrusion may produce only a minimal defect. The second anomaly is one in which the cul-de-sac terminates one or two segments more cephalad than usual with or without a variation in its diameter (fig. 9). In a few instances the cul-de-sac will terminate above the level of the lumbosacral interspace. In the presence of either condition but especially of the latter, it is obvious that a lumbosacral protrusion may not be disclosed by iodized oil or any other contrast agent. When such anomalies are present and the iodized oil examination is found to be negative, the roentgenologist should state that the presence of a protruded lumbosacral intervertebral disk cannot be excluded. This is important, because if the history and physical signs indicate the probable presence of a protruded intervertebral disk, an exploratory laminectomy over the lumbosacral interspace may be advisable.

Fig. 9.—Protruded intervertebral disk between fourth and fifth lumbar vertebrae. Note absence of shadow of nerve sleeve at site of protrusion. Anomaly of the cul-de-sac, which is short and terminates just below the lumbosacral interspace. Compare with figure 1, in which the cul-de-sac presents the usual normal appearance.

ACCURACY OF THE METHOD

In a series of 203 cases in which laminectomy was performed and in which a roentgenologic diagnosis of protruded intervertebral disk had been made, the diagnosis was confirmed by the surgeon in 194 instances.[9] In one case no lesion was found to account for the iodized oil deformity (error of commission). In eight instances a lesion other than a protruded disk was found by the surgeon (error of interpretation) and they may be listed as follows: chronic arachnoiditis with contraction of the dura, one; fracture of a twelfth thoracic facet, one; vascular tumor, varices and so on, four; hypertrophied ligamentum flavum, one; neurofibroma, one. In the same period a protruded intervertebral disk was found by the surgeon in seven other cases in which the iodized oil examination had been reported as negative. It is interesting that all of these occurred at the lumbosacral junction, where there is a very good anatomic reason for the error. At this level the spinal canal is relatively large and the diameter of the caudal sac may be small because of its fusiform termination. Under such circumstances even a large protruded disk may exist without indenting the sac. In five of these seven cases an anomaly of the cul-de-sac, as referred to, was present. It is obvious therefore that the iodized oil studies revealed the presence or absence of a protruded intervertebral disk with an accuracy of 92.3 per cent in a series of 210 cases on which operation was performed.

PROTRUDED INTERVERTEBRAL DISKS

WITH A NOTE REGARDING HYPERTROPHY OF LIGAMENTA FLAVA

J. GRAFTON LOVE, M.D.

ROCHESTER, MINN.

Protrusion of intervertebral disks into the spinal canal is a subject that has been much discussed during the recent few years.[1] That it should assume a large place in our daily efforts to relieve pain and suffering is justified because of the frequency with which we are called on to treat intractable low back and sciatic pain, which often is an expression of protrusion of an intervertebral disk or disks in the lumbar region of the spinal column. The protrusion of a portion of one or more intervertebral fibrocartilages, with the consequent compression of the spinal cord or of one or more nerve roots, provides us with a real anatomic and pathologic explanation for the disability experienced by many patients. Such an explanation has been sorely needed. Too many patients have been treated, all too often unsuccessfully, for such incorrect and meaningless diagnoses as "lumbosacral strain," "sacro-iliac dislocation," "sciatic scoliosis," "sciatic neuritis" and "lumbago."

Before proceeding further I should like to make myself clear regarding the frequency of the condition of protruded intervertebral disk which we are today able to diagnose accurately, and I should like to warn against considering every case of low back and sciatic pain a case of protruded disk. There are many other causes of pain in the lower part of the back and for pain which extends into one or both lower extremities.

At the Mayo Clinic, every person with low back and sciatic pain is seen by an orthopedic consultant either before the patient is referred to the neurologic section or in consultation with the neurosurgeon. Dr. Henderson [2] has collected figures from the cross-index filing system of the clinic which show that during the years 1935, 1936 and 1937 only 1.8 per cent of the patients seen by the orthopedic consultants because of low back and/or sciatic pain underwent laminectomy because of a diagnosis of protruded intervertebral disk. After the patients have been given their general physical and orthopedic examinations and the majority of those having low back and sciatic pain have been segregated, so to speak, only about 40 per cent of the patients suspected of having an intraspinal lesion as the causative factor in the complaint and referred to the neurologic section for further investigation come to operation for protruded intervertebral disk at the hands of the neurosurgeons.[3]

With this as an introduction to general discussion, the analysis of our more than 300 proved operative cases should excite no alarm about what might be considered our "radical" treatment of sciatic pain. In fact, it would seem that evidence is sufficient to justify the statement that laminectomy accompanied by removal of the protruded portion of an intervertebral disk is possibly the least radical of any known curative treatment for such a disabling condition.

During the past few years our experience with protruded intervertebral disks has been so extensive that we have been able, after a careful analytic study, to formulate a characteristic symptom complex for the lumbar lesions.[2]

A patient presenting himself for treatment with a complaint of intractable low back and sciatic pain, and who on examination exhibits spasm of the lumbar muscles, loss of the normal lumbar lordosis, positive Lasègue's and Kernig's signs, sciatic tenderness and diminution or absence of the homolateral achilles tendon reflex, is very likely to be suffering from a protruded intervertebral disk. If, in addition, there is a moderate elevation of the total protein content of the cerebrospinal fluid obtained on puncture in the lower part of the lumbar segment, and if there is a narrowing of the fourth or fifth lumbar intervertebral space, the picture is complete and a diagnosis of protrusion of a

From the Section on Neurologic Surgery, the Mayo Clinic.

Read before the Section on Radiology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 17, 1939.

1. Articles on the subject (continued in next column):

Love, J. G.: Protrusion of the Intervertebral Disk (Fibrocartilage) into the Spinal Canal, Proc. Staff Meet., Mayo Clin. **11**: 529-534 (Aug. 19) 1936.

Love, J. G.: The Rôle of Intervertebral Disks in the Production of Chronic Low Back and Sciatic Pain, ibid. **12**: 369-372 (June 17) 1937.

Love, J. G.: Special Nerve Root Retractor Used in Removing Protruded Intervertebral Disks, ibid. **12**: 393-394 (June 23) 1937.

Love, J. G., and Camp, J. D.: Root Pain Resulting from Intraspinal Protrusion of Intervertebral Disks: Diagnosis and Surgical Treatment, J. Bone & Joint Surg. **19**: 776-804 (July) 1937.

Walsh, M. N., and Love, J. G.: Protruded Intervertebral Disk as a Cause of Intractable Pain, Proc. Staff Meet., Mayo Clin. **13**: 203-205 (March 30) 1938.

Love, J. G.: Recurrent Protrusion of an Intervertebral Disk, ibid. **13**: 404-408 (June 29) 1938.

Love, J. G., and Walsh, M. N.: Protruded Intervertebral Disks: Report of One Hundred Cases in Which Operation Was Performed, J. A. M. A. **111**: 396-400 (July 30) 1938.

Deucher, W. G., and Love, J. G.: Posterior Protrusions of the Intervertebral Disks: Pathologic-Anatomic Aspects, Proc. Staff Meet., Mayo Clin. **13**: 697-699 (Nov. 2) 1938.

Love, J. G.; Adson, A. W., and Craig, W. McK.: Chronic Recurring Sciatic Pain Due to Protruded Intervertebral Disks, Journal-Lancet **58**: 479-481 (Nov.) 1938.

Dandy, W. E.: Loose Cartilage from Intervertebral Disk Simulating Tumor of the Spinal Cord, Arch. Surg. **19**: 660-672 (Oct.) 1929.

Mixter, W. J., and Barr, J. S.: Rupture of the Intervertebral Disk with Involvement of the Spinal Canal, New England J. Med. **211**: 210-214 (Aug. 2) 1934.

Naffziger, H. C.; Inman, Verne, and Saunders, J. B. de C. M.: Lesions of the Intervertebral Disk and Ligamenta Flava: Clinical and Anatomical Studies, Surg., Gynec. & Obst. **66**: 288-299 (Feb. 15) 1938.

Mixter, W. J., and Ayer, J. B.: Herniation or Rupture of the Intervertebral Disk into the Spinal Canal: Report of Thirty-Four Cases, New England J. Med. **213**: 385-393 (Aug. 29) 1935.

2. Henderson, M. S., in discussion on Walsh, M. N., and Love, J. G.: The Syndrome of the Protruded Intervertebral Disk, Proc. Staff Meet., Mayo Clin. **14**: 233-234 (April 12) 1939.

3. Weltman, H. W.: Personal communication to the author.

lumbar disk is justified. I have removed by surgical intervention at the time of laminectomy a classic protrusion of the disk in ten such cases without the use of radiopaque oil. Dr. Craig,[4] up to Dec. 9, 1938, had operated in twenty-seven cases in which the clinical diagnosis was made without the use of a contrast medium.

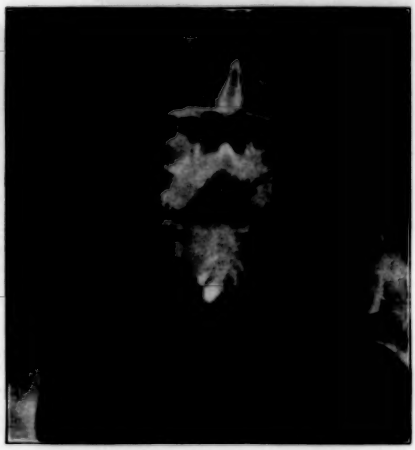

Fig. 1.—Anteroposterior view after operation showing the small amount of the laminae of the fifth lumbar vertebra which it was necessary to remove in order to remove a protrusion of the lumbosacral disk.

In spite of our ability to diagnose the lesion accurately in some cases, it seems to me that it is the better part of wisdom to employ a contrast medium in almost a routine way as a safeguard against overlooking multiple lesions, which we found in 12 per cent of cases in which radiopaque oil was used,[5] and to enable the surgeon to perform as short a laminectomy as possible (figs. 1 and 2). A shorter laminectomy naturally means a shorter operation, a shorter period of anesthesia and, to a certain extent, a shorter convalescence.

Just as there are some cases which are so typical that a clinical diagnosis of protruded intervertebral disk can be made and operation advised without visualization of the lesion by a contrast medium, there are occasional patients for whom we have advised and performed laminectomy for protruded intervertebral disk in spite of the failure of radiopaque oil to disclose an intraspinal lesion. I have operated on eleven such patients up to Nov. 22, 1938.[6] It was, in fact, the experience gained with these patients that led Dr. Craig and me to operate, without the employment of a contrast medium, on other patients having typical cases of protruded disk.

The following two reports will illustrate the points (1) of negative roentgenologic study made with radiopaque oil in the presence of a protruded intervertebral disk in the lumbosacral articulation and (2) a direct exploration for protruded disk on the basis of a clinical diagnosis.

4. Craig, W. McK.: Personal communication to the author.
5. Camp, J. D.: Unpublished data.
6. Love, J. G.: Protruded Intervertebral Disk (Fibrocartilage), to be published.

REPORT OF CASES

Case 1.—A woman aged 48 registered at the clinic Sept. 20, 1938, with a history of intractable left sciatic pain. She had sustained a slight injury to the back at the age of 12 or 13. Between the ages of 14 and 47 she had experienced many episodes of what was called "lumbago." The attacks of "lumbago" were usually precipitated by unusual exercise. In April 1938 she made a misstep and felt something give way in her back. It was necessary for her to sit down immediately; then she noticed an inability to cross her legs. After ten minutes she tried to get up, but she screamed with an excruciating pain in the back in the left sacro-iliac region. For four days she was unable to void urine or move her bowels. After a few days the pain began to radiate down the posterior surface of the left thigh. This pain was exaggerated by coughing and sneezing. After two weeks' time the pain began to subside and she was fairly comfortable until ten weeks prior to admission to the clinic, when she noticed gradually increasing pain in the left thigh with tendency of the pain to radiate to the left groin. The pain was so severe that it interfered with sleep, and the usual methods of treatment failed to give relief.

On examination a positive Lasègue's sign was elicited on the left side. Reflexes of both achilles tendons were markedly diminished. There was weakness of extension of the left toes and definite tenderness along the course of the left sciatic nerve. Roentgenologic examination of the spinal column revealed a narrowing of the space between the bodies of the fifth lumbar and first sacral vertebrae. Diagnostic spinal puncture revealed a total protein content of 40 mg. per hundred cubic centimeters of cerebrospinal fluid, with normal hydrodynamics. Roentgenologic examination of the spinal canal after introduction of 5 cc. of radiopaque oil did not disclose any intraspinal lesion. The patient was treated by Buck's extension of both extremities, a lumbar sling and diathermy. She was

Fig. 2.—Hemilaminectomy in the lumbar region for removal of unilateral protrusion of an intervertebral disk. Only a portion of the lamina on the left side was removed in this instance.

closely observed but failed to obtain any benefit. In spite of the negative results yielded by roentgenologic examination with radiopaque oil Dr. Ghormley, Dr. Walsh and I felt that the patient might have a protruded disk. Exploratory laminectomy for such a lesion was advised with the understanding that if a protruded disk was not found the patient was to undergo operation for bone graft, to be performed by Dr. Ghormley.

October 10 hemilaminectomy of the left lamina of the fifth lumbar vertebra was performed. As soon as this piece of bone had been removed, a marked thickening of the ligamentum flavum between the fifth lumbar and first sacral vertebrae was

observed. When the left half of the ligamentum flavum was resected, characteristic edema of the nerve root was observed and when the enlarged nerve root was retracted a large unilateral protrusion of the disk between the fifth lumbar vertebra and the first sacral vertebra was uncovered. The protrusion was still partially maintained by the posterior longitudinal ligament and, when this ligament was incised, two large fragments of fibrocartilage escaped. The removal of these fragments (fig. 3) restored the spinal canal to normal size and shape and removed pressure from the edematous nerve root. The radiopaque oil was then removed from the subarachnoid space and the wound was closed in layers.

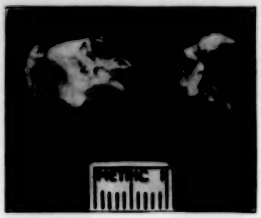

Fig. 3.—Two fragments of fibrocartilage which constituted the protrusion in case 1.

Dr. Ghormley was present at the operation and agreed with me that sufficient cause for the patient's symptoms had been found and removed and that operation for bone graft was unnecessary.

The patient's convalescence was uneventful except for the flare-up of an old subdeltoid bursitis. She was dismissed from our care October 27, at which time her wound was completely healed and she was free of her low back and sciatic pain.

CASE 2.—A man aged 35 came to the clinic with the chief complaint of pain in the left area of distribution of the sciatic nerve. Four years prior to admission to the clinic, while stooping over, he felt a snap in his back, immediately followed by severe pain in the lower part. Three years later severe aching and shooting pain developed in the left sciatic distribution. The pain was worse at night and often was relieved by getting out of bed and walking about. The sciatic pain was aggravated by coughing, sneezing and bending the head forward. For three months there had been constant low back and sciatic pain and the patient was unable to work. He walked with a distinct limp and a list. The left achilles tendon reflex was absent. There was a total protein content of 90 mg. per hundred cubic centimeters of cerebrospinal fluid. The original roentgenogram disclosed narrowing of the space between the fifth lumbar and first sacral vertebrae. Motions of the spinal column were markedly limited and Kernig's and Lasègue's signs were positive on the left. Because of the classic history and signs, the patient was operated on for a protruded intervertebral disk without the use of a contrast medium. The spinous process and the laminae of the fifth lumbar vertebra were removed. A large protrusion on the left of the disk between the fifth lumbar and the first sacral vertebrae was removed with complete relief of the patient's symptoms.

If the neurosurgeon undertakes to perform laminectomy for protruded lumbar disk without a previous demonstration of an intraspinal defect as outlined by the contrast medium, or if laminectomy is done after a study with radiopaque oil in which results were negative, the patient should be told of the possibility of an exploratory operation which may show nothing. However, in the light of our experience, a clinical diagnosis can be made with a degree of accuracy that is far above that of other commonly made diagnoses.

Before undertaking such an operation, it is essential to know what disks are most likely to be involved and it is well to bear in mind that the lesion is not infrequently multiple (10 per cent of all lesions were multiple in the series in which operation was performed). Of 300 patients operated on, fifteen suffered disk protrusions in the cervical or thoracic region of the spinal canal. I do not believe a neurosurgeon is justified in operating for a cervical or thoracic protrusion without first obtaining a roentgenologic demonstration of the suspected lesion with a contrast medium, unless there is a definite sensory level, which is always sufficient to justify laminectomy for an intraspinal lesion. However, since 96 per cent of all protrusions in the aforementioned 300 cases occurred at the third, fourth or fifth lumbar vertebral interspace, a direct operation for a lumbar protrusion based on a careful analysis of the observations should not often fail to disclose the lesion, and since in 84 per cent of the 300 cases referred to the protrusions occurred at the fourth or fifth lumbar interspace, the disks at these two interspaces should be exposed first. A removal of the laminae of the fifth lumbar vertebra and a resection of the fourth and fifth lumbar ligamenta flava will result in adequate exposure. If there is a protruded disk, its presence usually will be signalized by a marked thickening of the ligamentum flavum at that particular interspace (fig. 4). In a consecutive series of 175 cases of protruded disk, a note was made on the surgical cards of 155 cases that there was a definite, abnormal thickening or hypertrophy of the contiguous ligamentum flavum. In our earlier cases we came to look on the edema of the involved nerve root as the sentinel which led to detection of the protruded disk.[7] In the light of subsequent experience we have been warned, and usually of the site, of the protrusion by the thickening of the ligamentum flavum even before the edematous nerve root can be seen.[8]

But the yellow ligament which bridges the space between the laminae of adjacent vertebrae is by no means always thickened. It may be normal in thickness; in a few cases I have seen it thinned as if it had been eroded by the protruded fragments of disk substance. In one case I found that a long fragment of

Fig. 4.—How the protruded part of an intervertebral disk was removed without the performance of laminectomy. This was the second instance in which the protrusion of the disk was exposed and removed after the resection of a very thick ligamentum flavum without the resection of any portion of the laminae of the adjoining vertebrae: *a*, resection of the hypertrophied portion of ligamentum flavum; *b*, exposure of the protruded intervertebral disk; *c*, the spinal canal restored to normal after the removal of the protruded fragments of the disk.

7. Love, J. G.: Protrusion of the Intervertebral Disk (Fibrocartilage) into the Spinal Canal, Proc. Staff Meet., Mayo Clin. 11: 529-534 (Aug. 19) 1936.

8. Love, J. G., and Walsh, M. N.: Protruded Intervertebral Disks: Report of One Hundred Cases in Which Operation Was Performed, J. A. M. A. 111: 396-400 (July 30) 1938.

mentum flavum, much as a straw has been known to perforate a wood post during a tornado.[9]

The important point to remember about the ligamentum flavum is that although it may be of sufficient size to compress the nerve roots, causing intractable pain, this phenomenon without an associated protrusion of the disk is rare. In operating on 300 patients who had proved protruded disk, we have encountered only twelve cases of hypertrophy of the ligamentum flavum without an associated disk protrusion. Whenever a hypertrophied ligament is found, a diligent search should be made for protrusion of the underlying disk. The following case report is illustrative:

CASE 3.—A man aged 40 had had recurrent attacks of lumbago for twenty-four years. The attacks would occur once or twice a year and usually necessitated the patient's remaining in bed for a week or ten days. For ten years he had suffered a constant dull, aching pain in the lower part of the back. This pain was aggravated by motion. At no time was there any sciatic projection of the pain. Eight months prior to operation the patient experienced a sharp pain in the right lumbar region while bending over to pick up an object from the floor. This sharp pain in the right lumbar region persisted until the time of operation. At epidural injection there was a marked exaggeration of the severe, sharp pain in the lower part of the back, but at no time was there any extension of the pain into the hips or legs. The total protein content of the spinal fluid was 120 mg. per hundred cubic centimeters of cerebrospinal fluid. Roentgenologic study aided by radiopaque oil revealed a persistent defect opposite the interspace between the eleventh and twelfth thoracic vertebrae which was interpreted as a classic defect for a hypertrophied ligament without disk protrusion. At the time of laminectomy, a hypertrophied ligamentum flavum and a protrusion of the underlying disk at the eleventh thoracic interspace were removed. The patient has obtained complete relief from his backache since operation and he states that he now feels better than he has felt for many years. It is interesting to observe that this patient had suffered a marked narrowing of the space between the fifth lumbar and first sacral vertebrae with some hypertrophic changes yet at no time did he experience sciatic pain. Clinically, an intraspinal lesion occurring in the lower thoracic region was considered to be a diagnosis much more likely to be proved at operation as a cause of this patient's symptoms than the diagnosis of a lesion at the lumbosacral articulation, where a definite abnormality was seen on the usual roentgenologic examination.

TREATMENT OF PROTRUDED INTERVERTEBRAL DISKS

When the presence of a protruded disk has been diagnosed, a decision as to the proper treatment must be reached. If the patient's symptoms are mild and do not interefere to any great extent with his usual activities, some one of the more common therapeutic measures may be employed. However, the presence of the lesion must not be disregarded or passed over lightly, because another slight injury to the back may result in further protrusion of the involved disk, with sufficient narrowing of the spinal canal to produce paralysis of the legs. Case 4 emphasizes this point:

CASE 4.—A man aged 38 had for twenty-one years experienced a yearly recurrence of pain in the lower part of the back. The first attack had occurred following the lifting of a heavy sack, and each subsequent attack followed unusual stress, such as the lifting of heavy objects. One week prior to admission there was a sudden onset of severe pain in the lower part of the back, with bilateral sciatic extension, occasioned by the patient's efforts while cranking a tractor. Three days before admission a "dead feeling" developed in the right leg and there was gradually increasing motor weakness in the right lower extremity. For two days he had suffered incontinence of both bladder and bowel. The patient had noticed the development of a cough during the same day on which he had injured his back while cranking the tractor.

The neurologic examination showed a reduction of severe degree in motor power of the right leg. The achilles tendon reflexes of both extremities were absent. There was anesthesia in the cutaneous areas supplied by the fifth lumbar and first sacral nerves on the right. A diagnostic spinal puncture in the fifth lumbar interspace was performed and a specimen of cerebrospinal fluid was removed which contained 160 mg. of total protein per hundred cubic centimeters and 2 lymphocytes and 2 polymorphonuclear leukocytes per cubic millimeter of cerebrospinal fluid. The initial pressure of the cerebrospinal fluid was 20 cm. of water. The Queckenstedt test could not be performed because trial of it precipitated a paroxysm of coughing referable to the fact that the patient had an infection in the upper part of the respiratory tract and accurate readings could not be taken.

By the time the patient was considered to be in condition for operation (approximately two weeks after admission) both legs were paralyzed. A differential diagnostic spinal puncture was performed in order to localize the lumbar intraspinal lesion, which, because of the history, was suspected of being a protruded intervertebral disk. A spinal puncture needle was introduced into the twelfth thoracic interspace and clear fluid was obtained without evidence of spinal subarachnoid block. Another needle was introduced into the first lumbar interspace, once more with normal results. At the fifth lumbar interspace, yellow fluid was obtained with a complete spinal subarachnoid block. This fluid on examination revealed 1,200 mg. total protein per hundred cubic centimeters of fluid. Laminectomy was then performed under paravertebral anesthesia and a large fragment of a protruded disk was removed at the site of the fourth lumbar interspace.

Two months after this operation there was a marked improvement in the patient's condition. He was able to walk without aid, whereas it had been possible for him to walk only with the aid of crutches on leaving the hospital; and he volunteered the information that his back felt better than it had felt for five years and that there was no pain or soreness in his back or legs.

If the patient is very uncomfortable or is experiencing enough trouble to warrant bed treatment for two weeks, surgical treatment of the lesion should be advised. The surgical treatment consists of the removal of the protruded portion of the involved disk through a laminectomy wound.

CASE 5.—A man aged 35 had felt pain in the back and left leg intermittently for the past twelve years, occasioned by the patient's sustaining an injury. It was alleged that he had suffered fracture of the fourth and fifth lumbar vertebrae. There was no paralysis at the time of injury. The pain was exaggerated by coughing, sneezing and activity. Pain did not disappear during rest. The left achilles tendon reflex was slightly diminished. Roentgenologic examination of the spinal column produced negative results. The cerebrospinal fluid had a total protein content of 60 mg. per hundred cubic centimeters of fluid. Roentgenologic examination with radiopaque oil revealed an extradural defect on the left, opposite the lumbosacral articulation. Laminectomy, with resection of the hypertrophied ligamentum flavum and removal of a large protrusion of the disk between the fifth lumbar and first sacral vertebrae, was done. The patient made an uneventful convalescence. Postoperative neurologic examination yielded negative results. Complete relief of pain was achieved.

This is an operation which should not be undertaken unless the surgeon has had considerable experience with intraspinal surgery. The lesions are at times small and can be overlooked easily. The cauda equina must be handled only with extreme care, and hemostasis must be very accurate or a postoperative hematoma may nullify the relief that should ensue following the removal of the protruded disk.

9. Love, J. G.: Intractable Low Back and Sciatic Pain Due to Protruded Intervertebral Disks: Diagnosis and Treatment, Minnesota Med. 21: 832-838 (Dec.) 1938.

If radiopaque oil is used to localize the lesion, it should be injected into the subarachnoid space in the lumbar segment and the roentgenologic examination should be carried out on the day of operation. It has been our experience that injection of radiopaque oil in the presence of a space-occupying intraspinal lesion is much more likely to be followed by an exaggeration of the patient's symptoms than it would be if there were no intraspinal lesion. The larger the lesion, the greater the compression of the subarachnoid structure and the greater the chance for exaggeration of previous symptoms will be. This fact is not surprising, for I have noted that even a diagnostic spinal puncture in the presence of a large intraspinal tumor will result in the development of marked neurologic signs (and even paraplegia) which were not present prior to the withdrawal of cerebrospinal fluid from the region about the tumor.

If a protruded disk has been demonstrated and operation is to follow, the patient should be prepared for laminectomy. If the roentgenologic study with radiopaque oil is negative and if the other signs are not sufficient to warrant an exploratory laminectomy, the patient should be kept in bed overnight and allowed to leave the hospital the next morning, unless he was previously a hospitalized patient receiving other treatment.

Radiopaque oil is, of course, a foreign substance, and it is eliminated very slowly from the subarachnoid space.[10] It should therefore be used only in carefully selected cases. An intraspinal inflammatory lesion is a definite contraindication to its use.

More recently we have employed air[11] in the subarachnoid space as an aid to roentgenologic localization of protruded disks (fig. 5 *a* and *b*). When a definite defect can be shown, air is an excellent contrast medium, but the accuracy achieved by this method in our hands has not approached that resulting from the use of radiopaque oil.

The operation for the removal of a protruded disk is laminectomy. The laminectomy should be as short as possible, yet adequate to permit a satisfactory exposure of the protruded disk. The removal of one pair of laminae will ordinarily provide adequate exposure. In many cases I perform what I call a "partial laminectomy" (see fig. 1); that is, a removal of the edges of the laminae above and below the interspace at which the protrusion has occurred. The articular facets always should be preserved. On one occasion I was able to remove a protruded disk without the removal of any bone. Resection of the hypertrophied ligamentum flavum permitted exposure and removal of the underlying protrusion with complete relief of nerve root pressure and the intractable sciatic pain.

CASE 6.—A man aged 54 registered at the clinic Nov. 28, 1938, at which time he came seeking relief of intractable left sciatic pain of four months' duration. He had experienced onset of the pain in July 1938 while on a motor trip. The first symptom to appear was a difficulty in sitting. He noted that he had to rest first on one buttock and then on the other. There was a dull aching pain in the left lower lumbar region, which had become progressively worse. He had been kept in bed for several days in August, and he began to limp in September. He had discovered that the limp minimized the pain in the back. In October the pain was projected along the left sciatic nerve. The patient volunteered the information that pain was worse while he was in the sitting position and when he turned in bed. The pain was exaggerated by coughing and sneezing. The usual conservative treatment had failed to give relief.

Examination disclosed that the patient walked with a distinct leftsided limp. There was tenderness over the lumbosacral articulation and along the left sciatic nerve. The straight leg-raising test for the left extremity gave a positive reaction. The left achilles tendon reflex was somewhat diminished over that of the right. Roentgenologic examination of the spine disclosed a partial sacralization of the fifth lumbar vertebra with a definite narrowing of the fourth lumbar interspace. A spinal puncture by the patient's local physician had revealed a total protein content of 60 mg. per hundred cubic centimeters of cerebrospinal fluid. A combined diagnostic lumbar puncture and spinogram (air injection into the spinal subarachnoid space) were made at the clinic. After introduction of the lumbar puncture needle into the first lumbar interspace the air was injected under slight pressure, and 45 cc. of air was used to replace 40 cc. of fluid. When the fluid in the lumbar sac had been displaced by air, roentgenograms disclosed a left anterolateral defect opposite the fourth lumbar space. A diagnosis of protruded intervertebral disk was made and operation was advised.

December 1 a classic protrusion of the fourth lumbar disk was removed without the performance of laminectomy. The operation was planned as a left hemilaminectomy, but when the fourth interspace was exposed the ligamentum flavum was found to be unusually thick. When the left half of the ligament was resected characteristic edema of the underlying nerve root, with posterior displacement such as is seen with an underlying protrusion of the disk, was noted (see fig. 4). The involved nerve root was retracted and a large fragment of fibrocartilage was removed from the disk. This operation relieved the cauda equina of pressure and the wound was closed without removal of any bone.

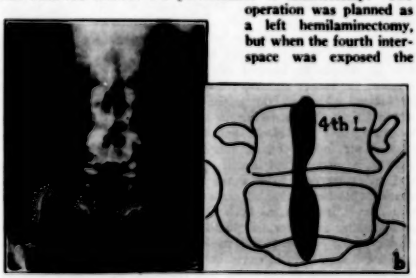

Fig. 5.—*a*, Anteroposterior view of the lumbar portion of the spinal column after the cerebrospinal fluid had been replaced with air. The point of the arrow indicates the defect in the air column caused by a protruded intervertebral disk; *b*, drawing to indicate the defect seen in the roentgenogram.

POSTOPERATIVE TREATMENT

The care of patients on whom laminectomy has been performed for the removal of a disk protrusion has gradually evolved into a very simple system. Since but little bone is removed and since the incision in the skin and fasciae is short and the heavy erector spinae muscles are reflected subperiosteally, there is little that could have an adverse effect on such a wound if an accurate anatomic closure has been effected. As has been stated, no bone grafting or fusing is done, therefore there is no need for splinting, casting or even keeping the patient quiet in bed. Instead, these patients are left to their own inclinations, so to speak, when they are placed in their beds after leaving the operating room, and they are encouraged to move their toes, feet and legs as soon as they recover from the effects protruded disk had completely perforated the liga-

10. Walsh, M. N., and Love, J. G.: Meningeal Response Following Subarachnoid Injection of Iodized Oil, Proc. Staff Meet., Mayo Clin. **13**: 792-796 (Dec. 14) 1938.
11. Young, B. R., and Scott, Michael: Air Myelography: The Substitution of Air for Lipiodol in Roentgen Visualization of Tumors and Other Structures in the Spinal Canal, Am. J. Roentgenol. **39**: 187-192 (Feb.) 1938.

of anesthesia. After every laminectomy the ability of the patient to move his toes should be observed and charted frequently during the first six hours after operation. After that his power should be determined several times a day for the first few days. If there is weakness that was not present prior to operation, hemorrhage should be suspected and the wound should be opened to exclude such a possibility. We have encountered only one postoperative hemorrhage in 300 laminectomies performed for the condition of protruded intervertebral disk. There has been one postoperative death in the series.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. SPURLING AND BRADFORD, DRS. CHAMBERLAIN AND YOUNG, DR. CAMP AND DR. LOVE

DR. WILLIAM JASON MIXTER, Boston: I will accept Dr. Love's change in nomenclature. The term "ruptured intervertebral disk" was used at first because it was not realized that in some of these cases the annulus was not ruptured but was protruded without being ruptured. I must disagree with Drs. Spurling and Bradford and say that the annulus is involved in the process as well as the nucleus pulposus, and so the term "extrusion of the nucleus pulposus" is not a good one. The differentiation between the fourth and the fifth disk, in my hands, has been rather more difficult than Dr. Spurling has indicated. I agree that air will show a certain percentage of extrusions. I doubt whether it will show small defects which will be shown by iodized oil; I doubt whether it will show some of the larger and more diffuse defects which will be shown by iodized oil. Air can be used in a certain number of cases which lie on the borderline in which one would not be willing to use iodized oil. If one gets a positive effect with the injection of air iodized oil is unnecessary, the dural sac will not have to be opened and it will make the surgeon's job a shorter and an easier one. But I am afraid that one has to admit a considerable percentage of error on the negative side. I believe that one is justified, as both Dr. Love and Dr. Spurling said, in operating in a certain number of cases in which there are classic signs without the use of a contrast medium. The greatest difficulty is in cases in which the signs are not classic, and here I come to the point that there are many patients with low back pain, possibly with sciatica, who should not under any circumstances have iodized oil injected because, as Dr. Love has already stated, a very large percentage of patients with sciatica and low back pain will recover spontaneously. It is only by picking out severe, intractable cases extending over months that one can eliminate the promiscuous and pernicious use of iodized oil in the spinal canal. The use of iodized oil in the spinal canal should be carried out only in the clinic when the patient is to be operated on. It is unfair to the roentgenologist who will have to examine that patient in the operative clinic, and it is unfair to the surgeon who is going to operate on the patient to use iodized oil, run it around in the spinal canal and then send the patient down to the ultimate operative clinic. One does not like to use iodized oil if one can help it, but the subject was developed on the basis of the use of iodized oil. We never would have gotten anywhere with protrusion of the intervertebral disk except by the use of that drug.

DR. CLAUDE MOORE, Washington, D. C.: As Dr. Mixter said, it is not fair to throw the burden of the responsibility of the diagnosis on the roentgenologist without definite indications. I would like to call attention again to the very definite and clear-cut pathologic changes demonstrated on the films shown by Dr. Camp and Dr. Love using iodized oil as compared with those of Drs. Chamberlain and Young using air. I admit that the use of air is an excellent preliminary procedure, but when the patient is going on to neurosurgery the added risk of iodized oil and colloidal thorium dioxide injected into the spinal canal is only slight compared to a major neurosurgical operation.

DR. L. H. GARLAND, San Francisco: Dr. Chamberlain has again demonstrated the value of air myelography in the diagnosis of large space-occupying lesions of the spinal canal (especially with thin patients and perfect radiographic technic), and Dr. Camp has pointed out the usefulness of the lateral projection for the diagnosis of hypertrophy of the ligamentum flavum. In my experience at the San Francisco Hospital I have found satisfactory diagnostic results with air in only about one tenth of the cases; in the remainder, iodized oil had to be used, either because preliminary air films were inconclusive or because the patient was so thick that we did not deem it advisable to use air. Now, Dr. Chamberlain uses air because he thinks that iodized oil, if left in the cerebrospinal system, may produce late, harmful changes. Dr. Mixter stated that if it gets into the skull it may produce intractable headaches. It seems to me that neither of these opinions is correct. We have made careful x-ray and clinical follow-up studies of twenty-five patients who had iodized oil injected into the spinal canals from one to fourteen years prior to the check-up, in amounts varying from 2 to 5 cc. (and in one remarkable case 10 cc.). In not one of these twenty-five cases is there any subjective or objective evidence to indicate damage to the central nervous system. We did an autopsy on one patient; it revealed the usual leptomeningeal thickening about some of the collections of iodized oil but absolutely no neural tissue changes. About two thirds of the patients had small intracranial collections of iodized oil in and about the basal cisternae without having any headache or other symptoms. As long as the roentgenologist or clinician knows that this intracranial oil is asymptomatic, and apparently harmless, he will not be disturbed by finding it. I do not advocate the indiscriminate intraspinal injections of any substance, gaseous or oleaginous, but I do believe that, in selected cases, the use of small amounts of fresh iodized oil is harmless. Its diagnostic value is far greater than that of air.

DR. J. DANIEL WILLEMS, Chicago: The general tone of conservatism of these papers has been gratifying. I am in a different position from the speakers; I am placed in somewhat of a referee position. These patients come to me after they have been operated on. I cannot talk in figures of 300 but I have several dozen by this time, patients who have been operated on in some of the best clinics in this country; they come back to me with all sorts of complications, weeks later and months later. Most of them are workmen; they should return to work, and I cannot for the life of me get them back to work. Of all the complications, the worst is the presence of iodized oil as shown by the x-ray film. I would make a plea for conservatism, especially in the use of iodized oil such as can be shown in x-ray films later.

DR. R. GLEN SPURLING, Louisville, Ky.: I proposed on two occasions before this Association the use of iodized oil for diagnosis of these intraspinal lesions, and I have used it without any fear of dangerous reaction or permanent disabling effects. However, I have always had more or less difficulty convincing orthopedic surgeons and others that iodized oil is an innocuous substance, and we know it is not entirely innocuous because after the immediate reactions there is always inflammation. I had this brought to my mind forcibly three months ago by a doctor who saw a relative of his with one of these lesions. I told him that I felt reasonably sure that there was a herniated nucleus pulposus at the fifth lumbar interspace. He said "You can operate, but you can't inject lipiodol." I think that represents the attitude of many in the profession regarding this drug, and if that argument could be eliminated from the whole picture of disease of the intervertebral disk some progress in the final solution of the problem would have been made. I do believe that with more mature consideration of the neurologic aspects, both subjective and objective, we can arrive at a definite, accurate diagnosis in a large percentage of cases that require surgery. I do not doubt that there are many acute cases in which localization cannot be made, but in my opinion most of these patients should not be treated surgically. It is only intractable cases that require surgery, of which I was speaking in my paper. As regards the terminology, I believe that in those cases in which there is a frank mass present beneath the posterior longitudinal ligament it is usually composed chiefly of nuclear material with fragments of annulus fibrosus attached to it. Our surgical specimens have been carefully examined grossly and histologically, and they have shown predominantly nucleus pulposus. Furthermore, when we remove one of these masses and inspect

the operative site carefully we see that the protrusion is immediately relieved, that the gaping edges of the posterior longitudinal ligament fall back together, and there is very little to tell the story of the former disruption. That, to me, is further argument that the presenting lesion is composed chiefly of nuclear material. Furthermore, that would bear out our conception of the symptomatology, since we feel that the low back pain is due to stimulation of the sensory nerve endings supplied by the recurrent branches of those nerves, and the root pain is due to a pressing mass beneath or outside the posterior longitudinal ligament which has impinged on one of the nerves at its point of fixation.

DR. W. EDWARD CHAMBERLAIN, Philadelphia: Our use of oxygen instead of air as the contrast medium for myelography is due entirely to the fact that oxygen disappears from the lumbocaudal sac (is absorbed) more rapidly than air. After the use of air the patient's sacrum must be kept higher than the foramen magnum for at least twenty-four hours, whereas after the introduction of oxygen, three or four hours of the special posture seems to suffice. However, Dr. Adson called my attention yesterday to an effective way of hastening the absorption of ordinary air. He simply has his patient breathe pure oxygen through the new Loveless mask. This reduces the nitrogen tension in the blood and brings the rate of absorption of ordinary air up to about that of oxygen. I wish to commend Dr. Spurling for his emphasis on the clinical neurologic study. There has been too much emphasis on studies with contrast mediums to the exclusion of clinical methods of examination. Just as too many radiologists have adopted the attitude that oxygen myelography is too difficult and iodized oil cannot be supplanted, too many clinicians have adopted a defeatist attitude toward the neurologic examination. In our many contacts with Dr. Fay and his associates in the Department of Neurology and Neurosurgery at Temple, we have learned to appreciate the value of the clinical neurologic examination as stressed by Dr. Spurling. When these intervertebral disk protrusions were first recognized, I think most of us took it for granted that symptoms from such a cause could be relied on to be either progressive or at least constant. But now we know that, as stressed by Dr. Mixter and again by Dr. Love, 80 per cent of patients with disk lesions manifest a distinctly intermittent symptomatology. This intermittent feature has aroused our special interest, for it is so marked as to suggest that the mechanical factor, the actual disk protrusion itself, must also be intermittent. That this may be the case is suggested by our recent demonstration, in quite a series of cases, that flexion of the spine tends to "withdraw" disk material from the spinal canal, while extension tends to produce or emphasize protrusion. In one of our surgical cases Dr. Fay demonstrated, on the operating table, this "withdrawal" and recurrence of the disk protrusion with flexion and extension of the spine.

DR. JOHN D. CAMP, Rochester, Minn.: I do not believe that any of the substances that have been talked about today are ideal substances for this work. Sooner or later somebody is going to perfect a radiopaque substance which can be injected into the subarachnoid space and be eliminated rather rapidly by the spinal fluid. When that time comes I feel that roentgenology will have added another great step forward in the study of many neurologic conditions.

DR. J. GRAFTON LOVE, Rochester, Minn.: Dr. Mixter has warned about the injection of iodized oil, and we have adopted the attitude. We have stopped injecting iodized oil for diagnostic purposes unless the patient has already planned—if the study is positive—to proceed with the operation, preferably the same morning. The injection is made in the operating room, Dr. Camp does his fluoroscopy, then the patient is taken back to the operating room and a laminectomy is performed. Walsh and I have collected, at the time of laminectomy, a number of specimens of fluid, and we have been able to show that there is an increase in lymphocytes following injection. They reach their height within one or two hours and subside in from twenty-four to forty-eight hours, and the iodized oil, if removed immediately, appears as it did when it came out of the ampule, whereas if it is removed the next day it has the appearance of clabber or sour milk, and it is during that period that there are irritating properties to the iodized oil, and if there is a nerve compressed the symptoms are apt to be more marked. The same thing is seen in spinal tumor; the symptoms may be remarkably exaggerated following removal of a sample of fluid. So if there is an intraspinal injection, operation should not be delayed. In some of my earliest cases I purposely left the iodized oil in and did not open the dural sac because of the marked extradural bleeding which sometimes occurs. Some of my first cases were so troublesome that I wanted to maintain the hydrostatic effect in the caudal dural sac. Certainly, the large number of patients who had been chronic invalids and had been incapacitated for any type of work and who were relieved by laminectomy and were out in a short time following use of iodized oil is some proof. The patients we deal with are incapacitated, patients who have been in bed for six months, patients who have had various operations, who have had bone grafts, who have had manipulations under anesthesia, who have been in bilateral spica casts for three to six months. A protrusion of the fourth lumbar disk cannot be differentiated from a protrusion of the fifth disk. One can show a protrusion of any of the lumbar disks with the same clinical and neurologic manifestations. There is an important point about the intermittence of symptoms that has intrigued all of us. Why will these patients get relief? my orthopedic colleagues ask me. In the past, we have brought about fusion in some of these cases, seeing the number of protruded intervertebral disks. It is my feeling that, if the protrusion is at the lumbar sacral disk and a massive bone graft is applied, the patient may be cured. If a sacro-iliac joint is fused it would have no effect on the patient. I think that as time goes on some of these patients cure themselves, the edema subsides and the tissue contracts, because this is not neoplastic.

THE EFFECTS OF OBSTETRIC ANALGESIA ON THE NEWBORN INFANT

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The effect of obstetric analgesia on the newborn infant has been the subject of considerable discussion during the past few years both in medical literature

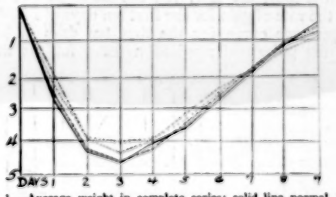

Chart 1.—Average weight in complete series: solid line normal, dotted line McCormick modification of Gwathmey technic, dashes paraldehyde, dots and dashes pentobarbital sodium.

and in the lay press. Analgesia has been accused of depressing the vital functions during the first few days of life, of causing permanent damage to the cerebral centers and of increasing fetal mortality.

Since obstetric analgesia is becoming so widely used, it is important to determine whether such is the case.

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Read before the Section on Obstetrics and Gynecology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 18, 1939.

The group in which the McCormick technic of analgesia was used is presented through the courtesy of Dr. Prentiss Wilson, Washington, D. C.

A comparative study of large groups of newborn infants under the same environmental conditions, some of whose mothers received analgesia while those of others did not, would appear to be the logical method of approach to this problem. If obstetric analgesia is harmful to the infant, it should be reflected in the mortality rate

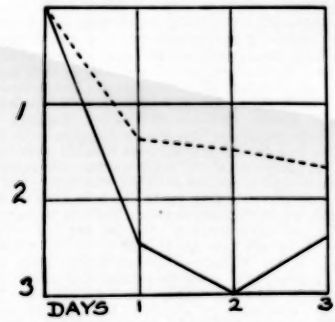

Chart 2.—Average weight in paired series: solid line normal, broken line paraldehyde.

and the records of the vital functions during the first ten days of life. We have completed such a study and herewith submit a summary of our observations.

METHODS

Eight hundred consecutive babies born of mothers delivered by the vaginal route in private practice were selected for this study; in 500 instances the mother received paraldehyde either alone or in combination with some other drug, in 100 instances she was treated by the McCormick modification of the Gwathmey technic and in 100 she received pentobarbital sodium and scopolamine. The babies of 100 mothers who received no analgesia were used as controls.

In these groups the following factors were studied: (1) the mortality rate, (2) the initial loss of weight, (3) the rate of gain for the first ten days of life, (4) the temperature curve for the first ten days of life and (5) the pulse and respiration curve for the first ten

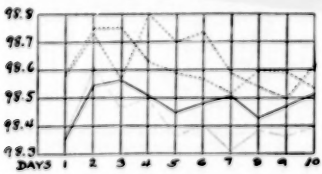

Chart 3.—Average temperature in complete series: lines as in chart 1.

days of life. Also due consideration was given to the duration of labor, the type of delivery, the dosage of the analgesia used and its effect on the subsequent clinical course of the infants after birth.

One hundred additional cases were selected for a more detailed study. In fifty the mother received paraldehyde analgesia. In each of these cases the infant was matched with another child, born on the same day and of approximately the same birth weight but whose mother received no analgesia. The two babies were fed identical formulas and the environmental conditions were the same. In these cases the temperature, pulse and respiratory rates were recorded every four hours and the weight was checked twice a day for the first three days of life.

The time interval between delivery and the initial respiration was checked with a stopwatch on 100 paraldehyde babies and 100 control babies.

Dosage of Analgesia.—The average dosage of paraldehyde was 17.5 drachms (66 cc.) given with an average of $\frac{1}{60}$ grain (0.012 Gm.) of morphine sulfate. The usual initial dose was from 6 to 8 drachms (23 to 31 cc.) of paraldehyde by rectum and one sixth or one fourth grain (0.011 or 0.016 Gm.) of morphine hypodermically, the paraldehyde being repeated in 3 or 4 drachm (12 or 15.5 cc.) doses as often as necessary. The largest total dose given was 38 drachms (142.5 cc.) of paraldehyde and one fourth grain of morphine. It is apparent and we wish to emphasize the fact that in this series of cases large doses of analgesia were used. If analgesia has an effect on the child, such effects would certainly be demonstrable in this group.

In the group of mothers treated by the McCormick technic, the average amount given was 1.53 doses of the mixture and 4.99 grains (0.32 Gm.) of pentobarbital sodium.

In the group receiving pentobarbital sodium and scopolamine the average total dose was 6.78 grains (0.44 Gm.) of pentobarbital sodium and $\frac{1}{200}$ grain (0.0003 Gm.) of scopolamine.

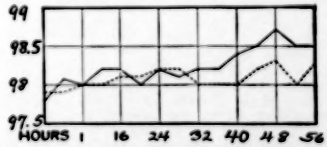

Chart 4.—Average temperature in paired series: solid line normal, broken line paraldehyde.

RESULTS

Duration of Labor.—The average duration of labor in this series of cases was seventeen and one-half hours for primiparas and thirteen and one-half hours for multiparas. This is corroborative of the observations made by Rosenfield and Davidoff,[1] Colvin and Bartholomew [2] and Kane and Roth [3] and definitely demonstrates that labor is not prolonged by the use of any of these types of analgesia.

Incidence of Operative Delivery.—It has long been recognized that any factor which increases the incidence of operative delivery adds to the fetal risk. The type of delivery in the various series of cases is summarized in table 1. The high incidence of forceps is due to the fact that we use prophylactic forceps as a routine and do not consider it an increase in operative intervention.

Effect of Analgesia on Fetal Mortality Rate.—In the 500 cases in which paraldehyde analgesia had been given there were eleven fetal or neonatal deaths. This represents a gross mortality rate of 2.2 per cent. Table 2

1. Rosenfield, H. H., and Davidoff, R. B.: Paraldehyde as a Factor in Painless Labor, Surg., Gynec. & Obst. **68**: 235-238 (Feb.) 1939.
2. Colvin, E. D., and Bartholomew, R. A.: Advantages of Paraldehyde and Basic Amnesic Agent in Obstetrics, J. A. M. A. **104**: 363-367 (Feb. 2) 1935.
3. Kane, H. F., and Roth, G. B.: Use of Paraldehyde in Obtaining Obstetric Analgesia and Amnesia, Am. J. Obst. & Gynec. **39**: 366-369 (March) 1935.

lists the cause of death in the individual cases. There were seven instances in which the cause of death could be ascribed definitely to factors other than the analgesia. In the remaining four cases death was attributed to atelectasis. Of these four cases, one mother received only 6 drachms (23 cc.) of paraldehyde and another 10 drachms (38.8 cc.). One mother received 34 drachms (127.5 cc.) of paraldehyde and one sixth grain of morphine in a period of forty-four hours. This infant's urine gave a strong reaction for paraldehyde. If one considers these four deaths to be due to the paraldehyde, the fetal mortality rate from the drug is 0.8 per cent. Adair states that in many stillbirths there is no demonstrable lesion at autopsy other than atelectasis. Dr. Choisser,[4] pathologist of the George Washington Hospital, reports that actelectasis is a common finding in stillbirths but that it is not more frequent in cases in which the mothers have received paraldehyde than in those in which no analgesia was given. We can conclude only that the paraldehyde may or may not have been the cause of death, but we feel that in any group as large as this a like percentage of babies will die from atelectasis or unknown causes resulting in atelectasis, regardless of whether analgesia was used or not.

TABLE 1.—*Types of Delivery*

	Normal	Paraldehyde	McCormick	Pentobarbital Sodium
Low forceps	2%	81.4%	21%	87.5%
Midforceps	1%	10.3%	3%	4.0%
Breech	3%	3.3%	5%	8.0%
Version extraction	0	0.3%	1%	0
Spontaneous	94%	4.7%	70%	4.0%

In the group of McCormick babies there were two deaths, representing a gross mortality rate of 2 per cent. One of these babies had hydrocephalus and the other was premature with atelectasis.

In the pentobarbital sodium group there was one neonatal death of a baby with exomphalos, giving a gross mortality of 1 per cent and a corrected mortality of 0.

THE EFFECT OF ANALGESIA ON INITIAL RESPIRATION OF INFANT

In 100 cases in the paraldehyde group the interval between delivery and onset of respiration was determined by a stopwatch and compared to the corresponding interval recorded on 100 babies whose mothers received no analgesia. The average intervals in the two groups were 39.5 and 9.8 seconds respectively.

Granting that the initial respiration is slightly delayed, the question still arises "Does this slight delay have any injurious effect on the baby?"

Birth Injuries.—There was only one birth injury in this series of cases: Erb's paralysis developed as the result of traction on the neck exerted to deliver the impacted shoulders. In the follow-up studies of these babies during the past five years there has been no instance of convulsions, mental retardation, spastic paralysis or other evidence of neurologic defects. From these data it seems reasonable to conclude that cerebral injuries in the newborn are due to mechanical factors, usually faulty obstetric manipulation, rather than to the drug given the mother.

MORBIDITY

Pediatricians have repeatedly stated that babies whose mothers are given analgesia during labor are sluggish and drowsy for the first three or four days of life and that they fail to nurse properly and therefore lose more weight and become more dehydrated than babies whose mothers receive no analgesia. This has not been our experience, as the following data will show:

Weight.—The average daily weight changes of the 489 babies whose mothers had paraldehyde, the ninety-eight babies whose mothers were treated by the McCormick technic and the 100 babies whose mothers had no analgesia are shown in chart 1. The maximum loss of weight was reached on the third day in all groups. Thereafter all the babies gained steadily and at approximately the same rate. The average total loss of weight on the third day was 4.5 ounces (128 Gm.) in the paraldehyde group, 4.1 ounces (116 Gm.) in the McCormick group and 4.7 ounces (133 Gm.) in the control group. We were surprised to find that the control babies lost more weight than those whose mothers had

TABLE 2.—*Cases of Fetal Death*

Case	Duration of Labor, Hours	Dose of Analgesia: Paraldehyde, Drachms	Dose of Analgesia: Morphine Sulfate, Grain	Type of Delivery	Weight: Pounds	Weight: Ounces	Time of Death	Maturity	Autopsy Results
1	4	12	⅙	Breech	2	2	24 hr. post partum	6½ months	Premature
2	..	..	..	Spontaneous	2	0	24 hr. post partum	6½ months	Premature
3	30	36	..	Low forceps	3	12	3d day	7½ months	Anencephalic
4	12	21	..	Low forceps	7	6	24 hr. post partum	Full term	Congenital, hydronephrosis, bronchopneumonia
5	16	14	⅙	Breech extraction, forceps to after coming head	4	9	24 hr. post partum	8½ months	Tentorial tear
6	16	9	⅙	Breech extraction, forceps to after coming head	6	3	Stillbirth	Full term	Tentorial tear
7	12	14	⅙	Low forceps	4	2	Stillbirth	8 months	Congenital fetal edema, erythroblastosis
8	8	10	⅙	Low forceps	6	5	24 hr. post partum	Full term	Atelectasis
9	4	6	⅙	Low forceps	4	13	24 hr. post partum	8½ months	Atelectasis
10	20	28	⅙	Low forceps	5	1	14 hr. post partum	8 months	Premature
11	44	34	⅙	Low forceps	8	0	Stillbirth	Full term	Asphyxia, urine positive for paraldehyde

TABLE 3.—*Percentage of Babies with Temperatures Over 100 F.*

	Day Post Partum: 1st	2d	3d	4th	5th	6th	7th	8th	9th	10th
Normal	2	4	4	5	2	2	1	0	1	0
Paraldehyde	1.4	2.2	3.6	1.6	1.8	1.4	1	0.4	0.2	0.4
McCormick	1	4	2	4	1	1	1	1	1	1
Pentobarbital sodium	1	8.3	4.1	8.3	8.3	8.3	2	4.1	4.1	1

4. Choisser, Roger: Personal communication to the authors.

received analgesia. Recently Cole [5] has published similar observations.

The average daily change of weight of the fifty pairs of babies is shown in chart 2. The average total loss at the end of three days was 1.9 ounces (54 Gm.) in the paraldehyde group and 2.5 ounces (71 Gm.) in the control series. Here again the greater loss of weight of the group without analgesia is striking. Cole believes that this increased loss of weight of the group of spontaneous deliveries without analgesia is due to increased trauma to the fetal head, which causes shock.

TEMPERATURE, PULSE AND RESPIRATION

The average daily temperature of the four series of cases is represented in chart 3. There is no significant difference between the group whose mothers received analgesia and those whose mothers did not.

It is often stated that analgesia results indirectly in dehydration of the infant owing to its disinclination to take fluids. Dehydration is usually accompanied by an elevation in temperature. Analysis of the series of cases reveals that the percentage of babies whose temperature

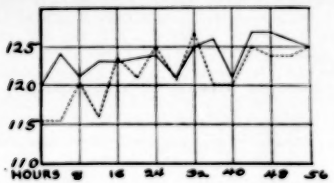

Chart 5.—Average pulse rate in paired series: solid line normal, broken line paraldehyde.

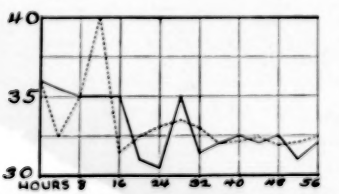

Chart 6.—Average respiration rate in paired series: solid line normal, broken line paraldehyde.

rose above 100 F. (table 3) was less in the paraldehyde and McCormick groups than in the control series. The largest percentage of babies with elevation of temperature above 100 F. was in the pentobarbital sodium group.

The average daily temperature (chart 4), pulse (chart 5) and respiration rates (chart 6) of the paired series of paraldehyde and control babies showed no significant difference. The temperature ranged between 97.8 and 98.7 F., the pulse rate between 115 and 127 and the respiratory rate between 30 and 40 in the two groups.

In these paired babies the nursing personnel was unable to note any significant differences between the group in appetite, food consumption, degree of dehydration or attitude except that the babies whose mothers had had analgesia were slightly more drowsy for the first twenty-four hours.

5. Cole, W. C. C.: Obstetrical Influences on the Weight Curve of the Newborn, Surg., Gynec. & Obst. **68**: 179-186 (Feb.) 1939.

CONCLUSIONS

Obstetric analgesia, properly administered, does not increase the infant mortality or morbidity rates above those which occur in a series of infants whose mothers were delivered without analgesia.

1835 Eye Street N.W.

ETIOLOGIC FACTORS IN NEONATAL ASPHYXIA

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AND
L. E. DANIELS, M.D.
DETROIT

Asphyxia of the newborn infant has assumed an entirely new significance in recent years for two reasons: a greatly modified conception of the inauguration of respiration and the demonstration of the various pathologic changes that may be produced in the central nervous system by anoxia. Until very recently it had always been supposed that the normal baby was born in a state of physiologic apnea and that as the placental circulation ceased to function the accumulation of carbon dioxide in the blood stimulated the respiratory center and caused respiration to begin.

The studies of Snyder and Rosenfeld [1] have caused us to change this conception almost completely. They have shown beyond much question of doubt that the movements of respiration do not start suddenly at the time of birth but occur in regular rhythm during the latter third of intra-uterine life. According to them there is little essential difference between intra-uterine and extra-uterine breathing except that amniotic fluid instead of air enters the lungs in the former and that of course gaseous exchange does not take place. Moreover, once these movements are established they are continuous and not interrupted unless some profound influence is exerted on the fetus. If this conception is correct, the normal infant should take its first extra-uterine breath within a very few seconds after delivery, and a new importance attaches to the baby that is not breathing at birth. It means that any baby who does not breathe within at the most thirty seconds after delivery must be profoundly affected by something, whether it is strangulation, anesthesia, narcosis, or shock as a result of the trauma of labor.

Of even greater importance, however, than this changed conception of the inauguration of respiration has been the demonstration of the devastating pathologic changes produced in the central nervous system when it is deprived of an adequate supply of oxygen for even short periods of time. Yant and his co-workers [2] have shown experimentally that the cells of the brain are much more sensitive to oxygen want than most of the other cells of the body and that one minute of complete lack of oxygen may be sufficient to cause their death. Courville [3] has described similar changes following nitrous oxide asphyxia and in the newborn.

From the Woman's Hospital.
Read before the Section on Obstetrics and Gynecology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 18, 1939.

1. Snyder, F. F., and Rosenfeld, Morris: Intra-Uterine Respiratory Movements of the Human Fetus, J. A. M. A. **108**: 1946-1948 (June 5) 1937.
2. Yant, W. P.; Chornyak, John; Schrenk, H. H.; Patty, F. A., and Sayers, R. R.: Pub. Health Bull. 211, August 1934.
3. Courville, C. B.: Asphyxia as a Consequence of Nitrous Oxide Anesthesia, Medicine **15**: 129 (May) 1936.

Extensive areas of "devastation necrosis" have been observed in the brains of infants dying a few days after severe asphyxia at birth which are apparently identical with those observed in death from known anoxic states such as nitrous oxide anesthesia, acute alcoholic intoxication and hyperpyrexia. Schreiber [4] has emphatically brought to our attention the relationship of asphyxia at birth to serious degenerative changes in the brains of older children and has suggested that in many cases excessive sedation of the mother may be the causative factor.

Schreiber's contention that these serious changes are the result of anoxia, frequently resulting from sedatives given to the mother, places a tremendous responsibility on obstetricians who administer such drugs and pediatricians who care for infants after delivery. If it is true that severe degrees of anoxia produce these severe devastating lesions, then is it not possible that lesser degrees of anoxia will produce lesser lesions? It opens up a whole new field of speculation with regard to the possible etiology of such conditions as epilepsy, psychopathic personality and lesser degrees of mental inferiority.

Certainly the seriousness of these implications calls for an explanation regarding the role of sedatives and anesthetics in the production of neonatal asphyxia and an appraisal of their comparative importance with other factors leading to this state. Certainly asphyxia was a common occurrence before sedatives or anesthetics were ever administered during childbirth. Such factors as prematurity, the age, parity and health of the mother, accidents of labor, the various forms of dystocia, the duration of labor, the use of oxytocics and operative delivery must all be considered.

It occurred to us that a great deal of valuable information might be obtained from the analysis of a large series of deliveries in which as many as possible of the factors which might produce asphyxia were evaluated. Accordingly, we have reviewed the records of 5,000 mothers and babies delivered at the Woman's Hospital in Detroit during the years 1936 and 1937. The data were tabulated according to the punch card method, which permits the recording of a large amount of data in such a way that they may be accurately cross analyzed in any desired combination of circumstances.

The material at the Woman's Hospital is particularly well adapted to this type of study because 55 per cent of the patients were delivered by general practitioners, 33 per cent were delivered by obstetric specialists and 12 per cent were delivered by the resident staff. This provides for a wide variety of methods and skills. Moreover, all social groups and nationalities are well represented.

TABLE 1.—*Incidence of Asphyxia in Entire Series*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
Entire series	5,000	1.9	9.4	6.5	9.2	72.8

TABLE 2.—*Immaturity as Factor in Asphyxia*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
Prematures and twins	392	14.5	30.7	10.2	6.6	48.0
Full term	4,608	0.8	8.5	6.2	9.5	75.0

TABLE 3.—*Incidence of Asphyxia Among Primiparas and Multiparas*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
Primiparas	2,578	0.7	11.1	7.0	11.2	70.0
Multiparas	2,030	0.8	5.2	5.2	7.3	81.8

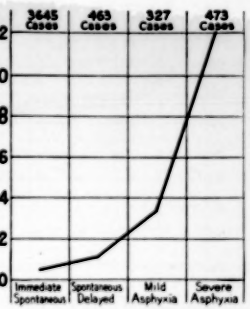

Chart 1.—Neonatal deaths in relation to degree of asphyxia.

SERIES AS A WHOLE

Table 1 shows the incidence of the various degrees of asphyxia in the entire series.

It is necessary to state at this point our method of determining the various degrees of asphyxia. Technically, asphyxia is a decrease in the amount of oxygen in the circulating blood and only indirectly associated with the respiratory movements. It is obviously impossible by present methods to determine the oxygen concentration of the infant's blood at the exact moment of birth. We chose as the best available criterion the condition of the baby at birth and the duration and amount of resuscitation necessary to establish independent breathing. The methods of resuscitation employed at the Woman's Hospital are the tracheal catheter, car-

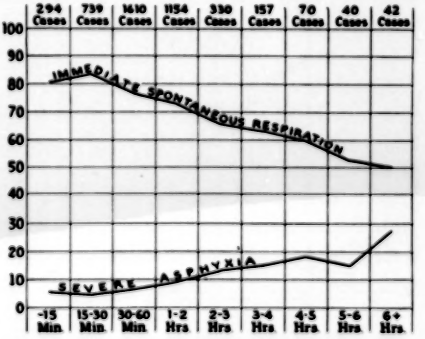

Chart 2.—Relation of cases of immediate spontaneous respiration to those of severe asphyxia when no sedative had been given the mother.

4. Schreiber, Frederic: Apnea of the Newborn and Associated Cerebral Injury, J. A. M. A. 111:1263-1269 (Oct. 1) 1938.

bon dioxide and oxygen inhalations, respiratory stimulants such as coramine and alpha-lobeline, mouth to mouth breathing and artificial respiration. We considered that any baby who required two or more of these methods of resuscitation was severely asphyxiated, particularly when it was noted on the chart that the

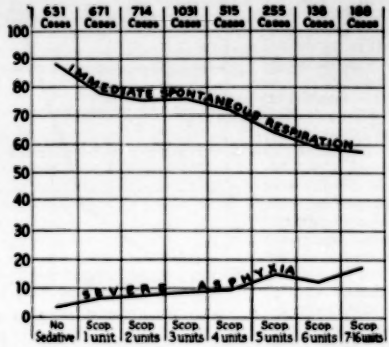

Chart 3.—Effect of scopolamine on respiration of infant.

child was in poor condition for several hours or days after birth. If only one method of resuscitation was employed the baby was classified as mildly asphyxiated. If respiration was spontaneous but delayed for more than thirty seconds the baby was classified as "spontaneous delayed." The stillborn group is obvious.

This method of classification is open to certain errors. One obstetrician might employ more resuscitation than another under similar circumstances, and the reverse is also true. Moreover, the retardation of respiration is not necessarily an accurate index to the oxygen saturation of the blood, but it cannot be very far off. However, we feel that in as large a series as 5,000 cases these differences are smoothed out and equalized. At any rate, it forms a constant standard of classification which applies to all subgroupings.

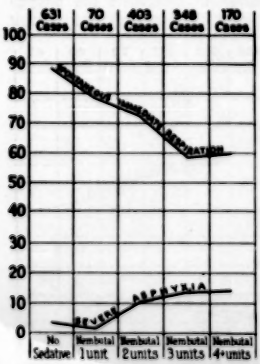

Chart 4.—Effect of pentobarbital sodium on respiration of infant.

It is important to note that these data were collected from records made before this study was contemplated and accordingly are free from any prejudiced influence by the attending physician or the recording nurse. Furthermore, the relationship of neonatal death to the degree of asphyxia shown in chart 1 bears out the point that a reasonably accurate method of classification was developed.

During this same period the incidence of stillbirths in the city of Detroit was 2.5 per cent. Otherwise we have no basis of comparison with results in other clinics, as no similar classification has ever been made.

Chart 1 shows the relationship of the degree of asphyxia to neonatal death (during hospital stay). In the "spontaneous immediate" group the rate was 0.5 per cent. In the "spontaneous delayed" group it was

TABLE 4.—*Age of Primiparas*

		Percentage				
					Spontaneous	
	No. of Cases	Still-born	Severe Asphyxia	Mild Asphyxia	Delayed	Immediate
Under 20 years	496	0.4	9.9	5.2	9.6	74.8
20-30 years	1,805	0.6	11.2	8.0	10.7	69.5
30-40 years	272	1.8	12.1	3.3	16.9	65.8

1 per cent, or twice as great. In the "mild asphyxia" group it was 3.5 per cent, or about seven times as great. In the "severe asphyxia" group it was 12.1 per cent, or about twenty-five times as great. This direct relationship is most striking and can hardly help being highly significant.

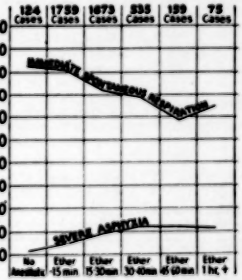

Chart 5.—Effect of ether anesthesia on respiration of infant.

FETAL FACTORS

The importance of immature development as a factor in asphyxia is shown in table 2. Prematurity undoubtedly is the most important single factor causing stillbirth and severe asphyxia.

The relationship of the size of the baby to the occurrence of asphyxia was studied by dividing the cases into groups for each pound of variation in their birth weight.

The three groups 6-7 pounds, 7-8 pounds and 8-9 pounds, which represent the general average, were essentially the same with about 8 per cent severe asphyxia and 76 per cent spontaneous respiration.

TABLE 5.—*Age of Multiparas*

		Percentage				
					Spontaneous	
	No. of Cases	Still-born	Severe Asphyxia	Mild Asphyxia	Delayed	Immediate
Under 20 years	58	0.0	3.5	6.9	8.6	81.0
20-30 years	1,196	0.7	4.7	5.1	7.1	82.4
30-40 years	738	0.7	5.9	5.1	7.7	80.6
Over 40 years	37	8.1	10.8	8.1	5.4	70.3

However, the group of the smallest infants, 5-6 pounds, showed 14 per cent severe asphyxia and only 68 per cent spontaneous respiration, while the group made up of the largest, over 9 pounds, showed but 5.5 per cent severe asphyxia and slightly over 80 per cent spontaneous respiration. This gives additional evidence of the importance of mature development in helping to withstand the forces tending to produce asphyxia.

MATERNAL FACTORS

Certain factors pertaining to the mother show a definite influence on the incidence of asphyxia in the infant:

A. *Parity.*—There were 2,578 primiparas and 2,030 multiparas in the series. The incidence of the asphyxia in these two groups is shown in table 3. A decided increase in asphyxia in the babies of primiparas is evident.

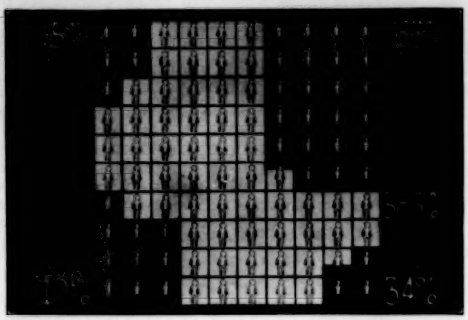

Chart 6.—Elective cesarean section at full term with general anesthesia in sixty cases.

B. *Age of Mother.*—The relationship between the age of the primiparas and multiparas to the incidence of asphyxia in their babies is shown in tables 4 and 5. Among primiparas, then, the incidence of severe asphyxia increases and spontaneous immediate respiration decreases with each advancing age period. In multiparas the opposite of the situation in primiparas occurs; the incidence of severe asphyxia decreases and immediate spontaneous respiration increases with each advancing age period until after 40, when an extreme reversal sets in. The high percentage of stillbirths by women over 40 is especially worthy of note.

C. *Health of Mother.*—Major illness of the mother is one of the very important factors tending to increase asphyxia in the baby, particularly in the case of premature birth. This is shown in tables 6 and 7.

FACTORS OF LABOR

One of the most important factors in the production of asphyxia is the trauma which the baby sustains from the forces of labor. Table 8 shows the influence of the duration of the second stage of labor. An inspection of this table shows very clearly that, with the exception of the first very short period, there is an increase in the incidence of asphyxia and a decrease in spontaneous immediate respiration with each increase in the duration of the second stage of labor. Chart 2 presents in graphic form this relationship. Severe asphyxia increases from a low of 4.6 per cent to a high of 28.6 per cent, and immediate spontaneous breathing decreases from a high of 84.6 per cent to a low of 50 per cent. It would seem clear that there is a direct relationship between the duration of the second stage of labor and the incidence of asphyxia in the baby. The high incidence of stillbirths in the longest two period groups is worthy of note. The somewhat greater incidence of asphyxia in the very short period group suggests that there is increased trauma to the baby in precipitate deliveries. The same relationship exists between the length of the first stage but in a much less pronounced degree. The trauma exerted on the baby during the first stage of labor is from the contracting uterus as contrasted to the direct trauma to the baby's head, as occurs during the second stage.

It will be shown later that the amount of sedative administered to the mother also has a direct relationship to the incidence of asphyxia. It might be argued that as the duration of labor increases the amount of sedative given also increases and that therefore the results shown in the foregoing tables are produced by the sedatives given rather than by the trauma of labor. In an effort to answer this point, the study was repeated on those mothers who received no sedatives whatever during labor. The result of this study is shown in table 9.

It is evident from a study of these tables that the same relationship obtains as in the preceding series, which included all cases, so that the effect is apparently due to the forces of labor and not to the sedatives.

FACTORS OF DELIVERY

The influence of the type of delivery on the incidence of asphyxia was next studied. If trauma to the infant is a factor in causing asphyxia, the type of delivery should be very important. The various types of delivery were further divided into those with and those without some known type of dystocia. There were 2,660 cases in which delivery was spontaneous. The incidence of asphyxia in this group is shown in table 10. There were 1,151 deliveries by low forceps, as shown in table 11.

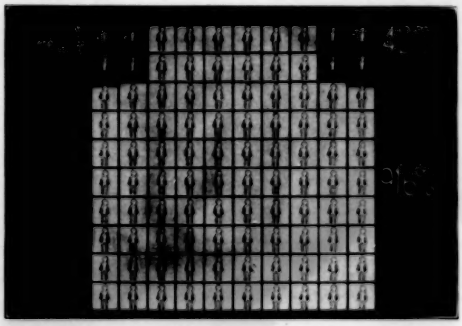

Chart 7.—Elective cesarean section at full term with spinal anesthesia in forty-eight cases.

Asphyxia occurs with considerably greater frequency in low forceps delivery than in spontaneous delivery. However, in most of these cases episiotomy is also performed, which necessitates anesthesia. As will be shown later, this is an important factor and probably accounts for a good deal of the increase in asphyxia in the low forceps group.

There were eighty-seven deliveries by version and extraction, in which group the incidence of asphyxia is extremely high, as shown in table 12.

There were 118 deliveries by breech extraction. The incidence of asphyxia in this group is shown in table 13.

There were 264 cases of other types of operative delivery, mostly mid forceps rotations and the like. The incidence of asphyxia in this group is shown in table 14.

TABLE 6.—*Health of Mother—Premature Birth*

	No. of Cases	Percentage				
		Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous Delayed	Spontaneous Immediate
Mother well	324	12.3	10.2	9.2	7.4	51.9
Mother ill	66	25.0	30.9	11.5	3.0	29.4

TABLE 7.—*Health of Mother—Full Term Birth*

	No. of Cases	Percentage				
		Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous Delayed	Spontaneous Immediate
Mother well	4,450	0.7	8.2	6.2	9.2	75.3
Mother ill	156	2.5	16.6	5.7	10.2	64.7

TABLE 8.—*Relation of Duration of Second Stage of Labor to Degree of Asphyxia*

	No. of Cases	Percentage				
		Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous Delayed	Spontaneous Immediate
Less than 15 minutes	294	0.7	5.4	5.1	8.5	80.3
15-30 minutes	729	0.7	4.6	5.0	5.6	84.6
30-60 minutes	1,610	0.4	6.7	6.6	9.3	77.0
1-2 hours	1,154	0.7	9.9	6.6	10.8	72.0
2-3 hours	330	0.7	12.3	6.4	13.9	65.8
3-4 hours	117	1.9	15.3	5.7	13.4	63.7
4-5 hours	70	0.0	18.6	10.0	11.4	60.0
5-6 hours	40	7.5	15.0	10.0	15.0	52.5
Over 6 hours	42	4.8	28.6	4.8	11.9	50.0

TABLE 9.—*Influence of Duration of Second Stage of Labor of Mothers Receiving No Sedative*

	No. of Cases	Percentage				
		Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous Delayed	Spontaneous Immediate
Less than 15 minutes	73	2.8	1.4	1.4	1.4	93.0
15-30 minutes	169	0.6	1.8	2.4	2.4	92.9
30-60 minutes	277	0.9	1.8	3.5	4.0	90.0
1-2 hours	88	2.2	5.8	3.5	3.5	85.0
Over 2 hours	22	4.5	...	...	13.6	81.9

A very brief inspection of this series of tables dealing with the type of delivery is sufficient to show what a tremendously important factor this is, especially when associated with dystocia. It serves to emphasize most emphatically that trauma to the infant is of major importance in producing asphyxia.

There were 108 cases of elective cesarean section and sixty-four in which labor had started. In the former the element of trauma is almost completely avoided, but the factors of anesthesia and sedation are not, as will be brought out later. In the latter group some element of trauma is added. The incidence of asphyxia in these two groups is shown in table 15.

SEDATIVE FACTORS

There were 631 mothers who received no sedative whatever during labor. Slightly more than one third of these were primiparas, so that it forms an excellent control group. The incidence of asphyxia in this group is shown in table 16.

The incidence of severe asphyxia is only 3 per cent as compared to 8.6 per cent for the series as a whole, and immediate spontaneous respiration is 88.1 per cent as compared with 75 per cent. This is a very impressive difference.

Morphine.—There were eighty-one mothers who received morphine within four hours of delivery. It has been said that morphine given during this time exerts a marked effect on the baby. There were 147 mothers who received morphine more than four hours before delivery. While the effect is not nearly as striking as in the preceding group, it is still very marked. The incidence of asphyxia in these two groups is shown in table 17.

Scopolamine.—The effect of scopolamine was studied by dividing the cases into groups based on the number of units administered; 1/150 grain (0.0004 Gm.) was considered as a unit. It should be noted that in the group receiving only 1 unit the incidence of severe asphyxia is twice as great as in the group receiving no sedatives and that immediate spontaneous respiration is 10 per cent less.

TABLE 10.—*Incidence of Asphyxia in Spontaneous Delivery*

	No. of Cases	Percentage				
		Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous Delayed	Spontaneous Immediate
All cases	2,660	0.4	4.4	5.2	6.6	83.4
With dystocia	359	0.3	5.5	5.6	7.2	81.*
Without dystocia	2,301	0.3	3.9	5.3	6.4	84.0

TABLE 11.—*Incidence of Asphyxia in Low Forceps Delivery*

	No. of Cases	Percentage				
		Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous Delayed	Spontaneous Immediate
All cases	1,151	0.9	10.3	6.3	10.2	72.3
With dystocia	125	2.4	16.2	5.2	12.0	64.0
Without dystocia	1,026	0.7	9.6	6.5	10.0	73.3

TABLE 12.—*Incidence of Asphyxia in Version and Extraction*

	No. of Cases	Percentage				
		Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous Delayed	Spontaneous Immediate
All cases	87	4.6	17.2	17.2	24.2	56.5
With dystocia	46	8.7	21.7	19.6	19.6	30.4
Without dystocia	41	0.0	12.2	17.1	29.8	83.9

TABLE 13.—*Incidence of Asphyxia in Breech Extraction*

	No. of Cases	Percentage				
		Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous Delayed	Spontaneous Immediate
All cases	118	0.8	22.0	5.9	24.6	46.6
With dystocia	25	4.0	44.0	...	28.0	24.0
Without dystocia	93	0.0	16.1	7.5	23.7	52.7

Chart 3 shows in graphic form the relationship of severe asphyxia to immediate spontaneous respiration with successively increasing dosage of scopolamine. It will be seen that with each additional dose of the drug the incidence of spontaneous respiration decreases, starting at 88.1 per cent and dropping to 56.9 per cent,

and that likewise the incidence of severe asphyxia increases correspondingly from 3.3 per cent to 18.6 per cent. It should also be pointed out that the number of cases in each of these groups is of such size that all variables should be satisfactorily smoothed out, so that this actually represents a scopolamine effect. In order to answer this point more fully, however, the cases that presented any other known factor which could have contributed to asphyxia were eliminated and the study was repeated in the remaining uncomplicated cases. All cases of operative delivery or of dystocia, all cases in which the second stage of labor lasted more than one hour, all cases in which any other sedative was given in combination with scopolamine, all accidents of labor and all cases in which the mother was not well were excluded. The analysis of this group is shown in table 19. It can readily be seen that the same effect is produced by administering scopolamine when as many as possible of the other contributing factors are eliminated.

TABLE 14.—*Incidence of Asphyxia in Mid Forceps Rotation*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
All cases	294	1.9	32.6	5.3	15.5	54.9
With dystocia	120	2.5	29.7	5.7	13.9	48.1
Without dystocia	197	1.5	12.1	4.7	17.7	63.5

TABLE 15.—*Incidence of Asphyxia in Cesarean Section*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
Elective	109	1.8	15.0	4.7	5.6	72.9
After labor	64	1.5	21.5	6.3	12.5	57.8

TABLE 16.—*Incidence of Asphyxia in Group in Which Mothers Received No Sedative*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
No sedatives	631	1.9	3.0	3.2	3.8	88.1

TABLE 17.—*Incidence of Asphyxia in Group in Which Mothers Received Morphine*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
Within 4 hours of delivery	81	6.2	34.6	7.0	12.3	39.5
More than 4 hours before delivery	147	0.0	17.7	8.8	15.6	57.8

Pentobarbital Sodium.—The same procedure was followed in cases in which pentobarbital sodium was given. The unit of pentobarbital sodium was taken as 1½ grains (0.1 Gm.).

Chart 4 shows in graphic form the relationship of severe asphyxia to immediate spontaneous respiration with increasing doses of pentobarbital sodium. It seems evident that pentobarbital sodium has a direct effect in increasing the incidence of asphyxia.

Paraldehyde.—Table 21 shows the incidence of asphyxia in cases in which paraldehyde was given.

ANESTHESIA

Ether.—Cases in which ether anesthesia was given were divided into groups on the basis of the length of time during which ether was administered before the birth of the baby. The results of this study are shown in table 22.

Chart 5 presents in graphic form the relationship of severe asphyxia to immediate spontaneous respiration on a basis of the duration of ether anesthesia. A direct relationship of asphyxia to the amount of ether given is apparent.

TABLE 18.—*Incidence of Asphyxia with Scopolamine (1/150 Grain Unit)*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
No sedative	631	1.9	3.0	3.2	3.8	88.1
1 unit	671	0.6	6.6	5.8	9.1	78.0
2 units	714	1.1	7.2	5.6	11.1	75.1
3 units	1,021	0.5	8.5	6.5	8.8	75.7
4 units	515	0.8	9.5	7.8	10.1	71.7
5 units	225	0.4	15.5	7.1	13.3	63.9
6 units	128	0.0	12.5	10.2	16.1	59.4
7-16 units	198	0.5	18.6	11.2	12.8	56.9

TABLE 19.—*Scopolamine Without Other Factors (1/150 Grain Unit)*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
No sedative	631	1.9	3.0	3.2	3.8	88.1
1 unit	63	0.0	4.8	4.8	6.4	84.1
2 units	64	0.0	9.1	3.1	9.1	78.1
3 units	102	0.0	12.7	4.9	5.9	76.5
4 units	39	2.5	12.8	2.6	7.7	74.4
5-9 units	39	0.0	10.2	7.7	7.7	74.3

TABLE 20.—*Pentobarbital Sodium (1½ Grain Unit)*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
No sedative	631	1.9	3.0	3.2	3.8	88.1
1 unit	70	0.0	1.4	7.1	12.9	78.6
2 units	488	0.5	10.2	6.2	10.9	72.2
3 units	548	0.0	13.5	10.1	9.9	59.2
4+ units	170	1.2	14.7	10.0	14.1	60.0

TABLE 21.—*Paraldehyde*

	No. of Cases	Percentage: Still-born	Severe Asphyxia	Mild Asphyxia	Spontaneous: Delayed	Spontaneous: Immediate
Paraldehyde	131	0.0	26.0	10.3	16.0	47.7

Nitrous Oxide.—There were only 240 cases in the series in which nitrous oxide either alone or in combination with ether was given. The incidence of asphyxia in this group is shown in table 23. The small number of cases in this group does not permit of further analysis, but the somewhat higher incidence of asphyxia in this group seems very definite.

Anesthesia in Cesarean Section.—The most striking effect of general ether anesthesia on the baby is shown in cases in which cesarean section was done. There were 108 full term, elective cesarean sections done in this series. Sixty of these were done under general ether anesthesia with a high incidence of severe asphyxia and stillbirths and a very low incidence of spontaneous respiration. Forty-eight sections were done under spinal anesthesia. These two groups of cases are entirely comparable in every way. All factors of labor and delivery are eliminated, so that the striking results shown are clearly due to ether. This is shown graphically in charts 6 and 7. There are 100 babies represented on each chart. The four corners are shaded to indicate the number of babies showing varying degrees of respiratory disturbance. The black squares represent the stillborn babies, the dark gray severe asphyxia, the lighter gray mild asphyxia, the off white spontaneous, delayed respiration and the white spontaneous, immediate respiration.

TABLE 22.—*Ether Anesthesia*

		Percentage				
					Spontaneous	
Duration of Ether Anesthesia	No. of Cases	Stillborn	Severe Asphyxia	Mild Asphyxia	Delayed	Immediate
None	124	1.6	1.6	4.8	8.8	83.0
Less than 15 minutes	1,700	0.4	6.0	4.7	7.6	81.2
15-30 minutes	1,673	0.4	9.5	7.3	10.9	72.3
30-45 minutes	335	1.8	12.7	6.5	9.1	69.7
45-60 minutes	159	1.9	12.5	10.1	17.0	58.5
Over 1 hour	75	5.3	12.0	4.0	13.3	65.3

TABLE 23.—*Nitrous Oxide Anesthesia*

		Percentage				
					Spontaneous	
	No. of Cases	Stillborn	Severe Asphyxia	Mild Asphyxia	Delayed	Immediate
Nitrous oxide anesthesia	240	0.0	14.2	6.6	11.1	67.5

SUMMARY

Five thousand consecutive deliveries at the Woman's Hospital in Detroit have been analyzed with a view of determining the relative importance of the various factors which contribute to the production of asphyxia in the newborn. The maturity of the infant, the age, parity and health of the mother, the duration of the various stages of labor, the type of delivery and the use of sedatives and anesthetics all exert important influences on the incidence of asphyxia. It should be noted that these factors frequently operate in combination.

CONCLUSIONS

1. The most important single factor in the etiology of neonatal asphyxia is prematurity.

2. The next most important factor is the trauma of labor, whether it is the normal forces of normal labor or whether it is accentuated by dystocia and operative delivery.

3. Sedatives in any amount definitely increase the incidence of asphyxia in the baby in direct proportion to the amounts given.

4. General anesthesia in any amount definitely increases the incidence of asphyxia in the baby in direct proportion to the duration of the anesthesia.

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ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. KOTZ AND KAUFMAN AND DRS. COLE, KIMBALL AND DANIELS

DR. C. O. MCCORMICK, Indianapolis: Dr. Cole and his associates in their analyzed study of 5,000 newborn infants verify the relation of each of the several known causative factors of asphyxia and emphasize the underrated influence exerted by analgesia and anesthesia. The benefit of analgesia is no longer directed to the mother alone but to the infant as well. This view is substantiated by another recent study by Dr. Cole, which demonstrated that babies born to analgesialized mothers suffer less birth shock and a less and briefer "physiologic" weight loss. However, since Schreiber has indicated the remote effects of prolonged apnea on the fetal brain, every obstetric attendant administering relief for labor pains should feel more keenly his responsibility. Analgesia and anesthesia administered without intelligent regard can be justly criticized. Dr. Cole shows the definite asphyxia-producing power of the old standby inhalation ether; likewise of nitrous oxide, and less so of the barbiturates. From all this comes the necessity of revaluating our analgesics and anesthetics in labor. The ideal method from the infant's interest must not interfere grossly with the oxygen content of the maternal blood. In this behalf rectal ether oil is to be commended in that the mother receives the usual amount of oxygen at all times, the respiratory rate is unaffected and the respiratory tract is not obstructed by mask or mucus. From the point of view of anoxemia, the best form of an obstetric anesthesia is either ethylene or cyclopropane, preferably the latter, which allows an oxygen content of as much as 80 per cent; or, better still, local or spinal anesthesia. I should like to ask Dr. Cole how he accounts for the lower incidence of the stillbirth rate of 1.9 per cent among his 5,000 cases compared with 2.5 per cent in the city of Detroit, when 88 per cent of his series of patients were delivered under sedation or anesthesia, 55 per cent of whom were handled by the general practitioner? The relationship between duration of second stage labor and the incidence of asphyxia shown by Dr. Cole endorses prophylactic forceps and, in the minds of some, the routine internal podalic version. Dr. Kotz assists us in three ways: 1. He further demonstrates that proper analgesia does not prolong labor, increase incidence of operative delivery or affect infant mortality or morbidity. 2. He contributes additional evidence that proper analgesia lessens birth shock and diminishes initial weight loss. 3. He evaluates three popular and successful methods of analgesia and indicates their respective efficiency. The favorable showing of rectal ether is noteworthy. The incidence of low forceps was only one fourth that of either the paraldehyde or the pentobarbital sodium method, and spontaneous delivery occurred seventeen times as frequently as under either of the two.

DR. FRANKLIN F. SNYDER, Chicago: Because labor itself is by no means a simple process but is complicated often unexpectedly by unforeseen events, the addition of still another factor, namely, the use of narcotic drugs, adds one more element which must be taken into account in the calculation of how normal birth is to be attained. How can one measure the effect of drugs on the fetus, keeping separate this factor from the mechanical trauma of labor? Direct observations of the intrauterine respiratory movements of the fetus provide an approach to this problem. In an experiment, the rate of fetal respiratory excursions of the rabbit was 30 per minute. Pentobarbital sodium was given to the mother rabbit. Fetal respiratory movements were promptly depressed and finally abolished. The mother, however, showed no such effect, being alert and having normal reflexes. If the fetus were not under direct observation, the striking depression of the respiratory system before birth would not have been detected, in view of the normal appearance of the mother. After inhibition of respiratory movements for an hour the fetus was delivered and breathed actively following birth, thus showing that there was no irreversible damage to the fetus despite the depressant effect. This experiment illustrates that intra-uterine respiration is a sensitive indicator which can detect the earliest effects of narcosis and permit evaluation of the extent to which a narcotic agent affects the fetus. The degree of narcosis may be expressed quantitatively in terms of

change in rate of fetal respiratory movements. Applying this method to compare various drugs used in obstetrics—morphine, paraldehyde, chloral, nitrous oxide, ether—the results show that most anesthetics of both nonvolatile and volatile types suppress intra-uterine respiration long before surgical anesthesia is reached in the mother. On the other hand, results with cyclopropane show that the attainment of one important objective of obstetric anesthesia is not beyond reach, namely the production of full surgical anesthesia of the mother without interruption of fetal respiration.

DR. JOSEPH B. DE LEE, Chicago: I want to talk particularly of the improvement in late infant morbidity. I want to call attention not to the toll of death but to their immediate and postponed sufferings later on in life. Imagine yourself put into a human manikin of appropriate size and driven by *vis a tergo* through the parturient canal. How would you like it? I know you would all demand cesarean section. But that is too dangerous. The milder cerebral injuries show up in the early months of life or in infant life or in late life by the finer macroscopic and even microscopic damage to the brain. Many years ago I used to do all my own postmortem examinations on babies and I noticed the great frequency of minute hemorrhages in the adrenal glands and at the base of the brain, which was sometimes sprinkled with them, and in the basal ganglions. Schreiber of Detroit has proved incontestably that asphyxia causes cerebral damage. Why may not some endocrinopathies seen by obstetricians be due to injuries which the baby suffers at birth? Regarding anesthesia causing asphyxia I think that we had better retrench a little; we have gone entirely too far in relieving the pain of childbirth. I do not mean that we should stop relieving the pain of childbirth but I should like to call a halt in the indiscriminate use of narcotics and anesthetics. I should like to recommend local anesthesia and get the patient's mind and the public mind into the proper receptivity for its widespread use. The damage to the baby's brain is produced not alone by the asphyxia but by the mild and severe traumatisms of even normal labor. Let us try to reduce the traumatisms of normal labor. The most important villain in increasing the traumatism of the baby's brain is solution of posterior pituitary. Mr. Chairman, I should like to recommend for next year that one whole morning, or possibly two, be devoted to these exclusive subjects: the use and abuse of anesthetics and narcotics in labor, and the use and abuse of solution of posterior pituitary in labor.

DR. L. MASON LYONS, Pierce City, Mo.: It is the duty of the members of our section to evolve unquestionably safe methods and procedures which will be available to and practical for the use of rural physicians. The great majority of babies born in this country are actually born in the country. Dr. McCormick spoke of the lesser danger of using cyclopropane and ethylene. It is impossible for me to take cyclopropane 20 miles into the country. These procedures are not practical in a rural community; neither are they safe when the obstetrician is usually alone or at best is assisted by a single nurse; when the occasion for anesthesia arises they are both too busy to bother with gas machines, rectal preparations and subsequent administration of ether and oil or paraldehyde or anything else. Since the obstetrician is not able to stay out in the country long enough to continue observation after intense narcosis, he should not even attempt their use. It is my experience that the use of barbiturates does narcotize babies. In about 200 recent deliveries I have not given a single dose of any sort of analgesia or any anesthetic. I recognize the use of anesthetics only for an obstetric emergency, and of these I recognize only operative intervention, which may be version and extraction, the necessity of performing and subsequently repairing an episiotomy or something of the sort. Forceps has not been used in my last 192 cases. It has never been taken from the bag. I decry the indiscriminate use of analgesia. If the obstetrician has the confidence of the mother, carefully explains what she must do to assist, talks to her, stands by her, her labor is easier, her pains are more tolerable, her baby is healthier, her labor is quicker and her subsequent course is more normal.

DR. M. S. LEWIS, Nashville, Tenn.: In discussing the effects of analgesia on the newborn one must recognize first that the normal fetus exists in the uterus in a constant state of cyanosis. Cyanosis, then, must be considered the normal state for the infant at birth and becomes pathologic only if unduly prolonged. Second, it is important to distinguish between asphyxia resulting from the narcotic and that resulting from the hazards of labor. Third, one must recognize that there is extraordinary variability in the manner in which different babies will react to the same drugs. Equally true, all drugs vary widely in the relative degree with which they depress the respiratory tract. In ten years I have observed 2,000 infants born to mothers who had received various analgesics during labor. They were divided into three groups. The first group of mothers received between 12 and 15 grains (0.8 and 1 Gm.) of amytal and 4.3 per cent of the babies were narcotized. The second group received barbiturates and scopolamine, 1 or 2 units, and 15.1 per cent of the babies were narcotized. The third group received morphine and scopolamine and 18.1 per cent of the babies were narcotized. All labors were terminated under nitrous oxide and oxygen. It is hard to understand why there would be any narcosis when a mother received only 1, 2 or 3 grains (0.06, 0.13 or 0.2 Gm.) of amytal, as has been shown here today, when I use an average dose of from 12 to 15 grains and only 4.3 per cent of the babies do not breathe spontaneously. Narcosis of the newborn may be influenced by a number of factors: First, trauma of labor, the size of the dose, the interval between the administration of the analgesia and delivery, and the effects of the drug on the mother. Infants who have been subjected to a long or difficult labor are definitely more susceptible to narcosis from all analgesics administered. This is illustrated in my series: In the operative deliveries 18.3 per cent of the babies were narcotized while in the spontaneous deliveries only 7.1 per cent were narcotized. The operative group did not receive any larger dose than those in the spontaneous group. When operative procedures are anticipated the drugs administered to the mother should be used sparingly and with care, since the infants that have been traumatized may not tolerate in addition any medication that may affect the respiratory system.

DR. MEYER BODANSKY, Galveston, Texas: There can be little question that the use of paraldehyde as an obstetric analgesic carries very little hazard, at least to the adult. Dr. Kotz has submitted evidence of its relative harmlessness to the newborn. At the same time, it must be recognized that exceptional instances do arise. In fact, less than a year ago Dr. Kotz himself reported a fatal case which he and his associates described as one of "idiosyncrasy to paraldehyde" (THE JOURNAL, June 25, 1938, p. 2145). A similar case was reported by Drs. J. L. Jinkins and J. Herrod (*Bull. John Sealy Hosp.* 1:27 [Feb.] 1939). A primipara aged 27 received 24 cc. of paraldehyde during labor and shortly thereafter fell into a deep coma lasting forty-four hours. The patient after a subsequent stormy course managed to survive. Dr. Jinkins' case suggested the possibility that the intensity and duration of the effect of the drug were perhaps related to previously coexisting but unsuspected liver impairment. An experimental study was undertaken to determine the effect of liver damage on the pharmacologic action of paraldehyde. In this connection, methods were devised for the accurate determination of paraldehyde in body fluids and respired air. My studies thus far indicate that the presence of liver damage reduces the rate of paraldehyde destruction and greatly prolongs the blood paraldehyde curve, this being accompanied by intensification and prolongation of the narcotic effect. Although I recognize that in general paraldehyde is a relatively harmless drug, nevertheless, on the basis of experimental results, I feel that hepatic insufficiency is a contraindication to its use. Concerning the effects on the newborn, one can only speculate. It is conceivable that, though a transient rise in the concentration of paraldehyde in the blood and tissues of the fetus may be of little consequence, a high level of concentration sustained for many hours may produce a quite different effect, of the pathologic changes of which nothing is known at present. The problem is, therefore, of more than academic interest. However slight the hazard may be, it nevertheless exists, and it is important for obstetricians to keep this fact in mind.

DR. G. D. ROYSTON, St. Louis: Anesthetics and analgesics all carry some dangers in their administration. These dangers, however, are outweighed by their advantages. In the Washington University Clinic, where scopolamine has been used in more than 20,000 labors, the fetal mortality has been somewhat

lower than in labors in which no analgesia was employed, possibly because of closer supervision during this time. Before we began its use in this institution animal experimentation was conducted under the personal supervision of the professor of pharmacology, whose wife was an early patient delivered under this method. These experimental studies showed that scopolamine in doses considerably larger than those used in semi-narcosis had no effect on either heart or respiration. It was also found that opium in any form, whether morphine, codeine, pantopon (hydrochlorides of the alkaloids of opium, principally morphine) or narcofine (the double salt of morphine and narcotine), depressed the respiratory center and also constricted the bronchioles, hence was a respiratory depressant. It must be remembered that other factors, such as dystocia, compression of the fetal head at the vulval ring, the addition of some anoxemia from ether or gas and the like, also add to the dangers of fetal asphyxia. It is important that analgesics be given in moderate dosage. Among more than 2,000 private patients whom I delivered under scopolamine personally administered, my present technic is as follows: As soon as it is determined that the patient is definitely in active labor she is given from 1½ to 3 grains (0.1 to 0.2 Gm.) of pentobarbital sodium by mouth and scopolamine hydrobromide 1 cc. (1/150 grain [0.5 mg.]) by hypodermic injection; forty-five minutes later scopolamine hydrobromide 1 cc. by hypodermic and forty-five minutes later a third dose of scopolamine hydrobromide 0.5 cc. (1/200 grain [0.2 mg.]). Thereafter she is given 0.5 cc. by hypodermic every hour and a half to two hours until delivered. The first stage of labor is slightly shortened and the second is somewhat lengthened. The total duration of labor averaged from thirty minutes to an hour longer with analgesia. Episiotomy and the avoiding of any protracted compression of the fetal head at the introitus markedly reduced the occurrence of delayed fetal respirations and fetal and maternal trauma. The advantages of analgesia are not limited solely to the relief of pain, as their judicious employment often permits a better test of labor until a safer period for intervention (delivery) is reached.

Dr. Jacob Kotz, Washington, D. C.: Dr. Lyons made the statement that in his last 150 or 200 deliveries he used no obstetric analgesia, that he merely talked to his patients. I wonder how many of you have ever had an attack of kidney colic and had somebody talk to you and remember how much relief you got from that. We have tried to give an honest description of what really happens to babies when mothers receive obstetric analgesia. It is true that the initial respiration is slightly delayed, but these babies respond rapidly to simple methods of resuscitation. We believe that paraldehyde, the McCormick technic, pentobarbital sodium and scopolamine, used by trained obstetricians in hospitals adequately prepared for the care of the unconscious patient, are safe methods to be employed during childbirth and should result in no greater mortality or morbidity to the mother or the baby than drop ether.

Dr. Wyman C. C. Cole, Detroit: It would be impossible to answer any important part of these questions in the space at my disposal. I hope that our position has not been misunderstood. We have no thesis that we have been trying to prove and the data which we have presented are simply presented as data. In fact, if we had any objective in mind in undertaking this study it was to show that scopolamine and pentobarbital sodium were harmless. We were not able to do so. We were able to show only a small part of our study today. The other questions that have been asked of us have been answered in the rest of our study, which I will be glad to let anybody see who is interested.

Bread in Reducing Diets.—This staple article of diet is probably more responsible for over-fatness than any other single item of food. Many adults, brought up in childhood on large quantities of bread, butter and jam, suffer from a "bread habit" and find the limitation of bread which is necessary in reducing diets extremely irksome. For some it is easier to give up bread altogether than to have it rationed; they prefer to eat biscuits or rusks. As a rule, however, a little bread should be included in every diet, if only for the purpose of teaching self control.—Christie, W. F.: Ideal Weight: A Practical Handbook for Patients, London, William Heinemann, 1938.

THE PRODUCTION OF PERSISTENT ARTERIAL HYPERTENSION BY CELLOPHANE PERINEPHRITIS

IRVINE H. PAGE, M.D.
INDIANAPOLIS

Perinephritis apparently has not been recognized as a possible cause of arterial hypertension. Occasionally hypertension has been recorded for patients whose renal parenchyma from one cause or another has been chronically compressed. Any genetic relationship seems, however, to have been ignored.

During the course of experiments designed to prevent the development of renal cortical collateral circulation, cellophane was tried because it was believed that it would cause little damage to the tissues. It was soon apparent that arterial hypertension had developed in the animals in which cellophane had been wrapped around the kidneys. Examination showed

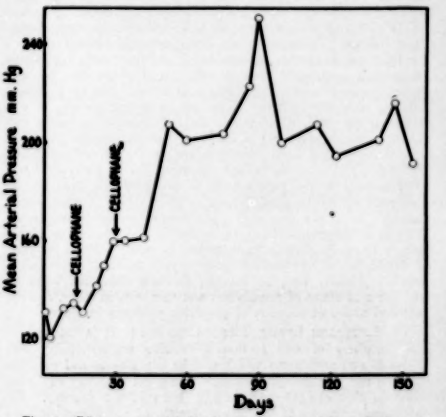


Fig. 1.—Effect on arterial blood pressure of applying cellophane to both kidneys.

them to be enclosed within a fibrocollagenous hull from 3 to 4 mm. thick. The cellophane had been fragmented and taken up, chiefly by the omentum.

The kidney bulged from the hull when it was cut, indicating that the parenchyma was held fast under tension.

The reaction of tissue to cellophane is extraordinary. Contact for relatively short periods (three to thirty days) is enough to evoke a proliferative reaction which continues for a time, at least, after the cellophane has been dispersed by the omentum.

METHOD OF PRODUCING PERSISTENT ARTERIAL HYPERTENSION

A dog, cat or rabbit is placed under pentobarbital sodium anesthesia, an incision parallel to the spine is made and a kidney is exposed and lifted from its bed. The fat is removed, and the organ is wrapped gently

From the Lilly Laboratory for Clinical Research, Indianapolis City Hospital.

Read before the Section on Pathology and Physiology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 17, 1939.

A preliminary report of this work has been published (Page, I. H.: A Method for Producing Persistent Hypertension by Cellophane, Science 89: 273 [March 24] 1939).

in cellophane sterilized in alcohol. The material may be applied much as if one were making a bag from a flat sheet, the ends being twisted together and held in place by punch paper-clips. String may be employed if it is not important whether the hull forms around the hilus of the kidneys or not. The cellophane need not closely approximate the surface of the kidneys, and it should exert no constrictive effect. Fluid has easy egress from the bag. With dogs the kidney may be dropped back into its bed without fear that its vessels will kink, but with rabbits and cats it is desirable to place one stay suture to insure that the kidney will maintain its proper position. The wound is closed with silk. The operation should take no more than ten minutes.

Various kinds of commercial cellophane have been employed, and most of them provoke an intense fibrocollagenous reaction. Ordinary Du Pont cellophane and sylphwrap are among the best for this purpose. The moisture-proof cellophane seems less reliable. Rubber (surgical glove), tinfoil and oiled surgical silk were found useless, although plain surgical silk was satisfactory.

Blood pressure was measured by a mercury manometer connected with a tube filled with heparin solution to a needle (No. 20) inserted into a femoral artery.

RESULTS

Within three to five days a sharp tissue reaction to the cellophane occurs, and during the next two or three weeks the constricting hull forms around the parenchyma of the kidney. Hypertension occurs whether one or both kidneys are placed in cellophane after the hull has formed. Usually three to five weeks is required for severe hypertension to occur.

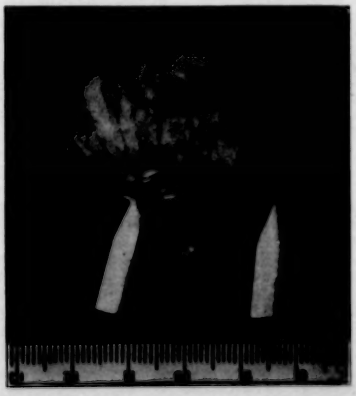


Fig. 2.—Kidney parenchyma surrounded by hull which does not involve the renal pedicle. The left hand arrow points to the rim of the hull, which clears the pedicle by a centimeter. The mean arterial pressure was 180 mm. of mercury. The other kidney was normal.

The hypertension may not be as marked or persistent if cellophane has been applied to only one kidney, though this is not always so. Application of cellophane to the other kidney may reinforce and stabilize the hypertension. It is usual for the blood pressure to reach a peak after the first two months, then to fall from 20 to 30 mm. of mercury and remain at an elevated level. Dogs have maintained hypertension for a year, and there is no reason to suppose it will not continue. The arterial pressure of rabbits and cats responds in much the same way, but apparently renal insufficiency as a result of the cellophane develops in rabbits with greater ease than in other animals.

Fig. 3.—Section of kidney after fibrocollagenous hull has formed as the result of wrapping the kidney in cellophane.

Removal of the Offending Kidney.—If hypertension has resulted from applying cellophane to one kidney and then this kidney is removed, the blood pressure falls within a day or two to the control level. In two experiments the constricting hull was peeled off; in one animal the blood pressure also fell to normal, but in the other the fall was more modest. The longer the hull remains on the kidney, the more difficult it is to strip off.

Renal Denervation.—The nerve supply to the kidneys was removed by stripping the pedicle, with great care, of all visible nerves, and then cellophane was applied to the kidneys. Hypertension developed in all of four animals.

Effect of Stripping the Capsule of the Kidney.—This procedure did not prevent the hull from forming around the kidney parenchyma and the development of hypertension when cellophane was applied.

Adrenalectomy.—In some experiments, after the removal of one adrenal gland, one kidney was wrapped in cellophane. After hypertension had developed, the remaining adrenal gland was removed. The blood pressure fell to normal or slightly hypertensive levels. Removal of both glands in animals with sustained hypertension also resulted in a sharp fall in arterial pressure. If adequate doses of adrenal cortex extract and sodium chloride were administered, moderate hypertension (from 150 to 180 mm.) continued.

Occurrence of Renin Activator.—The activating power of plasma for renin was determined in six dogs made hypertensive with cellophane. The method of Kohlstaedt, Page and Helmer[1] was employed. This consists of comparing the intensity and duration of con-

1. Kohlstaedt, K. G.; Page, I. H., and Helmer, O. M.: The Activation of Renin by Blood, Am. Heart J., to be published.

striction produced in an isolated dog's tail perfused with Ringer-Locke acacia solution when plasma from normal or hypertensive animals and purified renin are mixed and injected into the perfusion fluid.

It was found that the "activator," e. g. the substance in plasma which in combination with renin exerts a constrictor action on blood vessels, was definitely increased in the hypertensive dogs. The details of these experiments are contained in a communication by Kohlstaedt, Page and Helmer.[1]

COMMENT

The perinephritis caused by application of cellophane to the kidneys results in the formation of a fibrocollagenous hull which constricts the renal parenchyma. It is not necessary simultaneously to constrict the renal veins, artery or ureter.

The cellophane usually is fragmented and taken up by the omentum with the result that the omentum assumes a peculiar golden brown color and is filled with nodes, each of which contains small bits of cellophane.

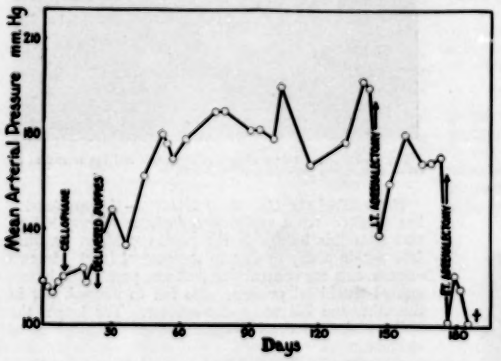


Fig. 4.—Effect on arterial blood pressure of applying cellophane to both kidneys and later removing both adrenal glands.

In spite of the disappearance of the cellophane from the kidneys, the hull continues to thicken for some time, though how long has not been determined.

Sufficient evidence has been collected to suggest that the physiologic mechanism responsible for the hypertension is similar to that concerned when hypertension results from constricting the renal arteries by the Goldblatt clamp. As in that type of hypertension, removal of the offending kidney abolishes the condition (Goldblatt, Lynch, Hanzal and Summerville;[2] Blalock and Levy[3]). Similarly, renal denervation does not prevent its development (Page;[4] Collins[5]). Adrenalectomy seriously modifies the capacity of the body to respond to the hypertensive stimulus (Goldblatt;[6] Page;[7] Collins and Wood[8]). Hypertension can be produced by applying cellophane to one kidney and is intensified and usually stabilized by applying it to both kidneys or removing one kidney and applying it to the other. The same applies to Goldblatt hypertension. And lastly, both types of hypertension are associated with an increase of renin activator in the blood (Kohlstaedt, Page and Helmer[1]). Removal of the constricting hull often causes the hypertension produced by cellophane to disappear.

The technic of producing hypertension by cellophane is simple and seldom results in failure.

Studies of renal function will be the subject of a separate report in collaboration with Dr. A. C. Corcoran of the Lilly Laboratory for Clinical Research. The morbid tissue changes have been described in a preliminary communication by Dr. Irving Graef, of the New York University Medical School, and myself.[9]

SUMMARY

1. Severe persistent arterial hypertension has been produced in animals by means of perinephritis induced by cellophane and silk. As a result of the perinephritis a thick, fibrocollagenous, constricting hull is formed around the parenchyma but avoiding the pedicle. Renal ischemia is thus produced by a method different in principle from clamping the renal arteries.

2. Removal of the offending kidney or the hull around the kidney abolishes the hypertension.

3. Denervation of the renal pedicle does not prevent the development of hypertension when perinephritis is induced.

4. Bilateral adrenalectomy in untreated animals abolishes the hypertension. If treated with adequate amounts of sodium chloride and adrenal cortex extract, slight hypertension persists.

5. The amount of the substance in the blood which combines with renin to form a pressor substance ("renin-activator") is increased.

6. Perinephritis may be an additional cause of arterial hypertension in man.

ABSTRACT OF DISCUSSION

DR. ALVIN G. FOORD, Pasadena, Calif.: May I ask what are the changes in the arteries and arterioles, as well as those in the parenchyma in the kidney, after prolonged constriction of the kidney by your method?

DR. IRVINE H. PAGE, Indianapolis: I should not discuss the question because I am not a pathologist. Dr. Irving Graef of the New York University College of Medicine is studying the material. For the most part, he finds relatively little change except when the malignant stage appears. There may be atrophy of the tubules and areas of fibrosis and infarction. Some of our animals have been alive for eighteen months, but such periods are too short to be certain of the ultimate morbid changes in the kidneys.

DR. FOORD: Would you expect that a similar tumor growth around a kidney in a human being would produce hypertension?

DR. PAGE: It did.

DR. FOORD: Yours was unilateral?

DR. PAGE: No, bilateral. The case was described in detail by Dr. Blatt and myself in the May issue of the *Annals of Internal Medicine*.

2. Goldblatt, Harry; Lynch, James; Hanzal, R. F., and Summerville, W. W.: Studies on Experimental Hypertension: I. The Production of Persistent Elevation of Systolic Blood Pressure by Means of Renal Ischemia, J. Exper. Med. **59**: 347 (March) 1934.

3. Blalock, Alfred, and Levy, S. E.: Studies on the Etiology of Renal Hypertension, Ann. Surg. **106**: 826 (Nov.) 1937.

4. Page, I. H.: Relationship of Extrinsic Renal Nerves to Origin of Experimental Hypertension, Am. J. Physiol. **119**: 166 (May) 1935.

5. Collins, D. A.: Hypertension from Constriction of the Arteries of Denervated Kidneys, Am. J. Physiol. **116**: 616 (Aug.) 1936.

6. Goldblatt, Harry: Studies on Experimental Hypertension: V. The Pathogenesis of Experimental Hypertension Due to Renal Ischemia, Ann. Int. Med. **11**: 69 (July) 1937.

7. Page, I. H.: The Effect of Bilateral Adrenalectomy on Arterial Blood Pressure of Dogs with Experimental Hypertension, Am. J. Physiol. **122**: 352 (May) 1938.

8. Collins, D. A., and Wood, E. H.: Experimental Renal Hypertension and Adrenalectomy, Am. J. Physiol. **125**: 224 (July) 1938.

9. Page, I. H., and Graef, Irving: Hypertension Following Experimental Perinephritis Induced by Cellophane, Arch. Path. **28**: 613 (Nov.) 1939.

NONSURGICAL ASPECTS OF THE KIDNEY STONE PROBLEM

FULLER ALBRIGHT, M.D.
HIRSH W. SULKOWITCH, M.D.
AND
RICHARD CHUTE, M.D.
BOSTON

Our purpose in this paper is to report some observations which have been made at the Stone Clinic of the Massachusetts General Hospital and in the Research Laboratory since a previous brief report [1] in 1937. This paper is not meant to be a well balanced discussion of all the nonsurgical aspects of the kidney stone problem.

The approach to the entire subject has remained fundamentally the same. It is based on the following major premise and its corollary:

Premise.—A patient with urine of such composition that some crystalloid precipitates out of it is predisposed to the formation of a stone composed largely of the precipitated crystalloid (compare cystine stone in cystinuria, uric acid stone in gout and calcium phosphate or calcium oxalate stone in hyperparathyroidism).

Corollary.—In a case in which there is a tendency for stones composed predominantly of a certain crystalloid to form, treatment should be directed to altering the composition of the urine in such a way that solution of the crystalloid is favored.

It is appreciated that the problem is not quite as simple as the foregoing propositions suggest. Stasis undoubtedly is a factor. Infection, on the other hand, while definitely a factor, probably plays its chief role by changing the composition of the urine (e. g. ammonia formation producing an alkaline urine and favoring the precipitation of phosphates and carbonates).

If one is to apply the aforementioned approach, it is necessary first to know the nature of the stone with which one has to deal. If mixed stones are disregarded, there remain four common types—calcium phosphate, calcium oxalate, uric acid and cystine. Each of these stones requires its own specific measures. For example, the urine should be made acid for calcium phosphate stones and alkaline for uric acid and cystine stones. With oxalate stones the p_H of the urine is unimportant. If no stones are available for analysis, one must resort to circumstantial evidence. A few differential points seem worthy of mention.

Staghorn stones are nearly always, if not always, composed of calcium phosphate or cystine. The latter in some cases have a pathognomonic appearance in the roentgenogram (fig. 1). Very suggestive of cystine stones is the coalescence of several small stones to form a large one (fig. 1 *A*). The individual small stones, furthermore, have a homogeneous, waxlike appearance, which is most characteristic but hard to describe (fig. 1 *B*). Cystine stones, of course, occur with cystinuria, so the diagnosis can easily be ruled in or out by testing the urine for cystine.[2] Phosphate stones, on the other hand, grow by surface apposition and their lamellar structure is often discernible in the roentgenogram. Infection of the urinary tract by an organism which splits urea is strong evidence that any stones which may be present are composed of phosphates and carbonates. Hyperparathyroidism usually causes calcium phosphate stones but occasionally calcium oxalate ones. A structure suggestive of a snowflake with spicules radiating from a central focus (fig. 2) is pathognomonic of calcium oxalate. Failure of the stone to show in the roentgenogram is strong evidence in favor of a uric acid stone.

DISSOLUTION OF KIDNEY STONES

It is, of course, one thing to prevent the formation of stones and another to dissolve them. A priori one might hope that, if precipitation of a crystalloid influences stone formation, the dissolving of the crystalloid from a stone might cause the disappearance of the stone. Such indeed seems to be the case. Stones, like teeth, are made of an organic matrix in which is deposited a crystalloid. However, there is one important difference. If the calcium is dissolved out of a tooth there is still a tooth; if the calcium is dissolved out of a calcium phosphate stone there is no stone. Such being the case, it becomes apparent that the dissolution of stones is not an impossibility.

Fig. 1.—Appearance of cystine stones in patient R. E. C. before operation: *A*, coalescence of small stone to form large one; *B*, stones with waxlike appearance

DISSOLUTION OF CYSTINE STONES

If a cystine stone is placed in a weakly alkaline solution in the laboratory, it very gradually disappears over a period of weeks or months. Thus a cystine stone weighing 0.1292 Gm. immersed in a borate buffer solution of p_H 8.0 at 40 C. lost 14.2 mg. (11 per cent) in eleven days.

It is very simple to keep the urine alkaline, and there is no reason why a cystine stone in the kidney pelvis should not disappear. And it does. Thus a girl aged 15 whose roentgenogram is shown in figure 1 entered the clinic Feb. 1, 1938. Kidney function was only moderately impaired and, surprisingly enough, the urine was not infected. The diagnosis, at once suspected because of the roentgenogram, was confirmed by the demonstration of cystine in the urine. It was thought (we now believe ill advisedly) that surgery was indicated. When this was completed the right kidney was out; there were still some stones in the left kidney and in the perirenal tissues (fig. 3 *A*), and the urine was infected with Staphylococcus albus. The patient was

From the Stone Clinic of the Massachusetts General Hospital and the Department of Medicine of Harvard Medical School.
Read before the Section on Pharmacology and Therapeutics at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 18, 1939.

1. Albright, Fuller: Some Medical Aspects of the Renal Stone Problem, New England J. Med. 217:1063 (Dec. 30) 1937.

2. To 5 cc. of urine made alkaline with ammonium hydroxide 2 cc. of 5 per cent sodium cyanide solution is added and allowed to stand for from five to ten minutes; a few drops of a freshly prepared 5 per cent sodium nitroprusside solution is then added; in the presence of cystine a permanent deep purplish red will develop.

then put on sodium citrate, 1 teaspoonful three times a day, to keep the urine alkaline. The intrarenal stones gradually disappeared (figs. 3 *A* and *B*). The urinary infection has persisted.[2a] The end result will probably be fairly satisfactory. Another time, however, we would try medical treatment from the beginning. These observations with regard to cystine stones, of course, have been made [3] before the present reports.

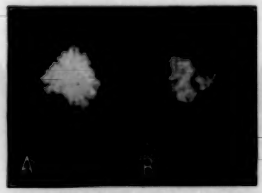


Fig. 2.—Appearance of calcium oxalate stones from two different patients. *B* is that of patient referred to in the text.

DISSOLUTION OF CALCIUM PHOSPHATE STONES

The problem with calcium phosphate stones is not so simple. Expose a calcium phosphate stone to an acetic acid solution at a p_H of 5.0 in the laboratory and in a very few days there is no stone. Keep the urine of a patient with a calcium phosphate stone in the kidney pelvis at a p_H of 5.0 for several months; the stone will become no larger but in most cases it will become no smaller. There is no question that the Higgins regimen,[4] one of the main features of which is the production of an acid urine, will cause an occasional calcium phosphate stone to disappear; the question is why the regimen does not work better than it does. The answer is quite apparent. The urine is very nearly saturated with calcium phosphate when it reaches the stone. The more acid the urine the more calcium and phosphate ions it will keep in solution, but the more acid the urine the more calcium and phosphate ions it already contains when excreted by the kidney. If one could cause the patient to excrete an acid urine without at the same time increasing the calcium and phosphate in the urine, the in vivo results should approach the in vitro ones.

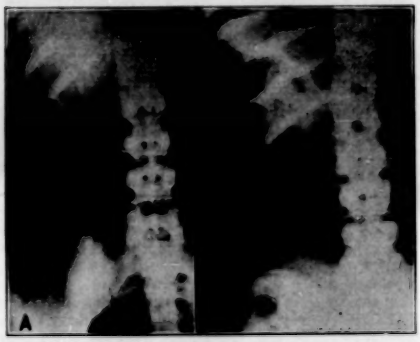


Fig. 3.—Appearance of cystine stones of patient R. E. C. (see figure 1). *A*, April 16, 1938, shortly after right nephrectomy and left nephrolithotomy; *B*, after ten months on medical regimen. Note that most of stones in the kidney have disappeared.

The logical sequel to this discussion is a consideration of the advisability of introducing some dissolving fluid into the kidney "from below" by a catheter. A study of what might be the most efficacious fluid to use has been under way in this laboratory for the past eight months. We are far from having all the answers, but a few simple facts seem clear.

The solution should probably be as acid as possible without being too irritating to the tissues. Urine can reach a p_H of 4.8. Solutions with a p_H of 4.0 seem to cause but little irritation, and this figure has arbitrarily been chosen for the time being.

The next question is what acid to use. Strangely enough, urologists in the past frequently have attempted to dissolve phosphatic calculi with phosphoric acid. This is the one acid not to use (v. infra). Citric acid has a property other than the fact that it is an acid, which suggests its use for this purpose. Dr. M. J. Shear several years ago first called the attention of one of us (F. A.) to the possibility of using citric acid for this purpose. It took a few simple test tube experiments performed in July 1938, however, to show us how efficacious citrate really is.

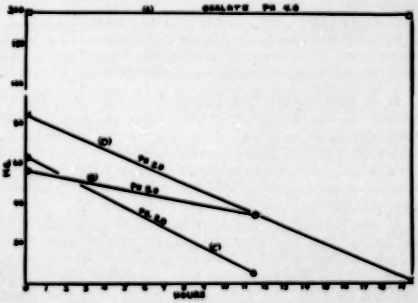


Fig. 4.—Rate of solubility of kidney stones in vitro at different p_H's with sodium citrate, citric acid mixture of 134 mm. per liter (isotonic): *A*, calculus consisting mainly of calcium oxalate, citrate solution p_H 4.0, temperature 25 C. *B*, fragment of calculus consisting mainly of calcium phosphate, citrate solution p_H 8.0, temperature 30 C. *C*, fragment of calculus from same stone as (*B*) at p_H 5.0, temperature 30 C. *D*, calculus consisting mainly of calcium phosphate, citrate solution p_H 5.0, temperature 30 C.

Before discussing the test tube experiments, it may be helpful to explain the specific property of citric acid previously mentioned. The following equation will help make this clear:

$$3\ Ca^{++} + 2\ Cit^{\equiv} \rightarrow Ca_3Cit_2 \rightarrow Ca^{++} + 2(CaCit)^{-}$$

It will be noted from the equation that the net result of adding citrate ions to a solution containing Ca ions is to divide the number of Ca ions by 3. The other two thirds of the Ca ions become caught in a complex $(CaCit)^{-}$ ion. Unfortunately this property of citrate solutions is at its maximum only at alkaline p_H's; at more acid p_H's there is little of the tertiary citrate (Ca_3Cit_2) formed and more of the secondary (Ca H Cit) and primary ($Ca[H_2Cit]_2$) citrates, neither of which produce $(CaCit)^{-}$ ions. However, both of these salts are weakly dissociated, so there is a marked reduction of calcium ions even at a p_H of 4.0. One can calculate the calcium ion concentration, given the total calcium, the citrate concentration and the p_H, from a nomogram constructed by McLean.[5]

2a. Urinary infection subsequently cleared up spontaneously.

3. Crowell, A. J.: Cystin Nephrolithiasis, Surg., Gynec. & Obst. **38**: 87 (Jan.) 1924.

4. Higgins, C. C.: Urinary Lithiasis: Experimental Production and Solution with Clinical Application and End Results, J. Urol. **36**: 168 (Aug.) 1936.

5. McLean, F. C.: Application of the Law of Chemical Equilibrium (Law of Mass Action) to Biological Problems, Physiol. Rev. **18**: 495 (Oct.) 1938.

The importance of this property of citrate is obvious. The speed of solution of calcium phosphate salts in any fluid will be decreased as the calcium or phosphate ions increase; any property of a fluid which will dispose of one of the end products of the reaction—in this case calcium—will speed up the reaction. The objection to phosphoric acid (v. supra) is, of course, that it supplies one of the end products of the reaction, namely phosphate ions.

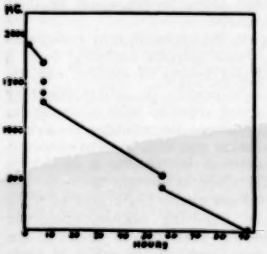


Fig. 5.—Rate of solubility of phosphate kidney stone in sodium citrate-citric acid mixture of 154 mm. per liter (isotonic) at p_H 4.0, temperature 25 C. Where loss in weight is not due to citrate solution points are not connected with a line.

The test tube experiments referred to, carried out in the first ten minutes of this eight months investigation, clarified the main points. They were all performed on a normal acid urine containing moderate amounts of calcium and phosphate. Table 1 presents the six experiments.

The most significant of these experiments is 3, in which a calcium phosphate precipitate is dissolved in an alkaline urine by adding sodium citrate. Experiment 5 suggests that a citrate solution will not help to redissolve oxalates, at least of an acid p_H, although it hinders precipitation of oxalates (experiment 6). More elaborate quantitative studies were designed to determine the effect of temperature, concentration, p_H, other salts and the like, but these are not yet completely satisfactory and will not be discussed here, especially since it appears possible that citrates may be superseded by hexametaphosphate (discussed later). The citrate solution which we used for the in vivo experiment discussed later had a p_H of 4.0 and a concentration of citrate which was twice isotonic. Its formula is given in table 2.

TABLE 1.—*Six Experiments*

1. Urine + ammonium hydroxide → calcium phosphate precipitate
2. Urine + ammonium hydroxide → calcium phosphate precipitate + acetic acid → clear solution
3. Urine + ammonium hydroxide → calcium phosphate precipitate + sodium citrate → clear solution
4. Urine + oxalate → calcium oxalate precipitate + acetic acid → no change
5. Urine + oxalate → calcium oxalate precipitate + sodium citrate → no change
6. Urine + sodium citrate (stand 1 hr.) + oxalate → inhibited precipitate

This is not altogether nonirritating.

EFFECT OF CITRATE SOLUTION ON CALCIUM PHOSPHATE STONES IN VITRO

Quite a large number of experiments have been conducted in which phosphate stones have been subjected to a constant interchange of the citrate solution at various temperatures, and their reduction in size has been noted. Some representative experiments are shown in figures 4, 5 and 6. The speed with which the stones dissolved was most encouraging. Some stones crumble; others decrease in size without crumbling.

IN VIVO EXPERIMENTS ON CALCIUM PHOSPHATE STONES

To date the solution has been tried on four patients. There has been only one convincing success. This patient (C. S.) was a hemophilic youth aged 19 who had had a hemorrhage into the spinal cord. This had resulted in a partial paralysis of the lower extremities and a "cord bladder." He had been bedridden for three years and had been on constant drainage for two years. In the lower extremities osteoporosis had occurred from disuse. The urine was constantly alkaline, owing to infection, and the bladder contained nine large lamellated stones (fig. 7). One of us (R. C.) saw him in consultation and thought that any surgical procedure was contraindicated. Accordingly the citrate solution was administered to the bladder by Munro's[6] tidal drainage apparatus. The stones rapidly disappeared, as shown in figures 8 and 9. It may be asked how it is known that the stones were destroyed rather than just decalcified. Figure 8 answers this. If the matrix remained intact, the calcified remnants would not be touching one another.

TABLE 2.—*Citrate Solution Used*

Sodium citrate	45.2 Gm.
Citric acid	38.0 Gm.
Distilled water	to make 1,000.0 cc.

In the three other cases there was no cause for discouragement, as definite reasons for the lack of success were present and as these can be avoided in the future. One of these cases will be discussed later.

APPARATUS FOR DISSOLVING STONES IN KIDNEY PELVIS

Needless to say, the object of these studies is based on the hope that a stone in the kidney pelvis can ultimately be dissolved by means of a ureteral catheter. An apparatus has been designed for alternately introducing fluid into and withdrawing it from the kidney pelvis. The principle behind this apparatus is the same as that in Munro's tidal drainage apparatus for the bladder. Some of the most important features of this apparatus and the initial impetus were furnished by Dr. William Davis. If the apparatus proves practicable, a description will be published under the authorship of two of us (F. A. and H. W. S.) and Dr. Davis. In its present form it was tried recently on a patient with a large stone in the kidney pelvis which

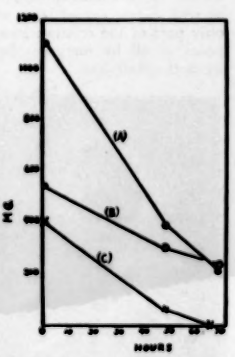


Fig. 6.—Rate of solubility of kidney stones in sodium citrate-citric acid mixture of 154 mm. per liter (isotonic) at p_H 4.0, temperature 40 C. *A* and *C*, calculi consisting of a large amount of calcium phosphate and some calcium carbonate. *B*, calculus consisting of a large amount of calcium phosphate and a moderate amount of calcium oxalate.

6. Munro, Donald, and Hahn, Joseph: Tidal Drainage of Urinary Bladder; Preliminary Report of This Method of Treatment as Applied to "Cord Bladders," with Description of Apparatus, New England J. Med. 212: 229 (Feb. 7) 1935.

had resulted from hyperparathyroidism. The apparatus was run for three days. The kidney filled and emptied satisfactorily, as determined by introducing 7.5 per cent sodium iodide into the apparatus and roentgenographing the patient. The stone showed no change. It was then

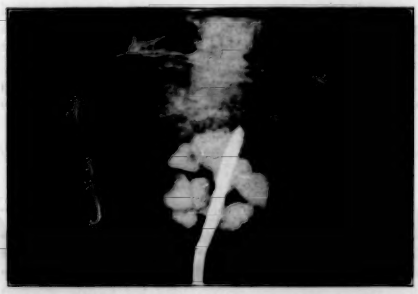


Fig. 7.—Stones in bladder before treatment.

removed and found to be an oxalate stone, which of course explains the failure.

The encouraging feature about this case was that the urine was sterile at the beginning and at the end of the three day run. She received sulfanilamide throughout. After the operation, however, the urine became infected.

SODIUM HEXAMETAPHOSPHATE

Prof. A. Baird Hastings suggested to us the use of sodium hexametaphosphate. The principle is the same as with citrate except that, whereas citrate disposes of only part of the calcium ions, hexametaphosphate disposes of all by merging them into complex calcium metaphosphate ions.

Fig. 8.—Appearance of stones shown in figure 7 after eighty hours of treatment.

The equations are as follows:

$$Na_2(Na_4(PO_3)_6) \rightarrow 2\,Na^+ + (Na_4(PO_3)_6)^{=}$$
$$2\,Ca^{++} + (Na_4(PO_3)_6)^{=} \rightarrow (Ca_2(PO_3)_6)^{=}$$

Sodium hexametaphosphate, as was to be expected, has been found most effective in the dissolving of stones in vitro. Best of all, it will actually dissolve calcium oxalate in a test tube. Of course it is not a biologic substance and metaphosphates (PO_3) do not appear in the body, so considerable caution must be exercised in its use. Recent studies in this laboratory by Dr. Max Rosenheim and Dr. Howard Suby have shown that sodium hexametaphosphate has a marked tendency to produce hemorrhages when introduced into the bladders of dogs.

SUMMARY

The following points are selected as the most important:

1. Cystine stones can often be diagnosed by their roentgenographic appearance.

2. A stone which gives the appearance by roentgenogram of a snowflake with spicules radiating from a central focus is composed largely of calcium oxalate.

3. Attempts to dissolve calcium phosphate stones by making the urine acid are attended with little success because acid regimens increase the amounts of calcium and phosphate in the urine and thus tend to render it saturated. The question of introducing a dissolving fluid "from below," therefore, is brought up.

4. A solution of sodium citrate-citric acid at a p_H of 4.0 is effective in dissolving calcium phosphate stones in vitro and in vivo (one case of stones in the bladder). This solution combines the effect of acids in dissolving phosphates with a specific effect of citrate in dissolving calcium salts by decreasing the calcium ion concentration.

5. More recent and less complete studies suggest that sodium hexametaphosphate solutions may be even more effective than citrate ones.

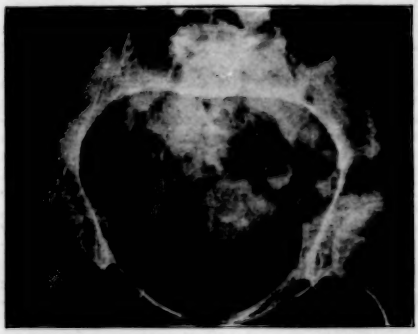


Fig. 9.—Appearance of bladder shown in figures 7 and 8 after ten more days of treatment. After still five more days of treatment stones had entirely disappeared, except for one small shadow, which persisted in spite of further treatment.

ABSTRACT OF DISCUSSION

Dr. Charles C. Higgins, Cleveland: Dr. Albright and his associates are to be congratulated on the excellent results they have secured in the dissolution of bladder stones. In considering the advisability of utilizing the high vitamin A acid-ash diet to produce the dissolution of a calculus which forms in urine the reaction of which is alkaline, the authors have mentioned a fact which I have been aware of for a long time. That is, by increasing the acidity of the urine one definitely increases the excretion of calcium; however, to offset this, I have observed that the solubility of the stone-forming salts increases more rapidly with increasing acidity than does the amount of calcium excreted. It is necessary to call attention to the fact that chemical formulas indicate only the ultimate products that may be obtained and in no way suggest the time required for equilibrium to be reached. Thus, while it is pos-

sible to say that by the formation of a complex citrate ion two thirds of the calcium ions may be removed from solution, there is no way of knowing that in the concentration of calcium involved and in the presence of the other constituents in the urine this equilibrium will be reached within a reasonable length of time. This will be especially true in cases of phosphates. When one recalls the work of Holt, LaMer and Chown, in which they found that equilibrium between calcium hydroxide and phosphoric acid was reached only after ten days had elapsed, the seriousness of this problem becomes more apparent. I have in my possession roentgenograms revealing stones composed of salts which had precipitated in urine the reaction of which was alkaline or acid, in which the high vitamin A acid-ash or alkaline-ash diets have been used. These roentgenograms have been sent to me by Dr. William Braasch, of the Mayo Clinic; Dr. W. M. Kearns, of Milwaukee, and Professor Pyrah, of Edinburgh, Scotland; the last case was a staghorn cystine stone which has undergone solution by the alkaline-ash diet in my own hands. I now have a series of fifty-two collected cases in which renal calculi have undergone solution by dietary means. The results of this study will be published in the near future.

Clinical Notes, Suggestions and New Instruments

PERFORATION OF THE JEJUNUM DURING A GASTROSCOPIC EXAMINATION OF A RESECTED STOMACH

JOHN M. RUMBALL, M.D., ROCHESTER, N. Y.

To the best of my knowledge there is no report in the literature of a perforation of the stomach or of the jejunum induced by the Wolf-Schindler gastroscope with a rubber finger tip. Five perforations of the stomach have occurred with the round rubber or sponge tip of Henning on the Wolf-Schindler gastroscope.[1] Three of these perforations were observed by Dr. Rudolf Schindler of the University of Chicago Clinics. The Henning tip has been discarded by most men doing gastroscopies since the report of these accidents.

The subject of the present report had been examined gastroscopically six months before, and at this time the Henning tip had been used. The gastroscope was introduced without any force into the jejunum and was then withdrawn so that the stoma could be observed. The patient had had a resection for carcinoma, and since it is my policy to examine these cases gastroscopically at least every six months or oftener if necessary, the examination described here was just a routine follow-up.

REPORT OF CASE

Mrs. F. K., aged 68, white, was admitted to the Rochester General Hospital Sept. 13, 1938, complaining of "stomach trouble" for the preceding three months. The predominating symptoms were weakness, constipation and excessive "gas." There was a mild secondary anemia and the gastric analysis showed a low acidity. The free hydrochloric acid reached only 18 degrees thirty minutes after the administration of histamine. The radiographic study of the stomach revealed a filling defect involving the antral portion of the stomach on the greater curvature side and extending back toward the body.

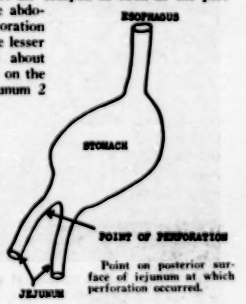
September 26 a gastric resection of the modified Polya type was done by Dr. D. C. Houghton, senior surgeon in the ward service. The loop of the jejunum was brought up posterior to the mesocolon. The resected portion showed a large crater-like ulcerating tumor, which was classified as a medullary carcinoma by our pathologist. There were no metastases noted anywhere in the abdomen. Two omental nodes were removed, but these showed no evidence of carcinoma. The operation was followed by a transfusion, and the patient made an uneventful recovery. She was discharged on her twenty-sixth postoperative day. Since her discharge she has gained 15 pounds (6.8 Kg.) and her only complaint is occasional "heartburn."

1. Schindler, Rudolf: Gastroscopy, the Endoscopic Study of Gastric Pathology, Chicago, University of Chicago Press, 1937, pp. 79-80; The Incidence of the Various Types of Gastric Disease as Revealed by Gastroscopic Study, Am. J. M. Sc. 197: 569-576 (April) 1939.

The first gastroscopic examination in January 1939 revealed an adequate stoma, which, however, did not contract rhythmically. There was some increase in the normal red appearance about the stoma. The mucosa of the remaining portion of the stomach showed some atrophic changes. No evidence of recurrence of the malignant condition was seen.

The second gastroscopy was done on the morning of June 15, 1939, at 10:30. The patient was prepared in the usual manner, and the Wolf-Schindler gastroscope with a rubber finger tip was introduced with ease, no force being used. After introduction no pain or discomfort was experienced by the patient. As is often the case, the gastroscope was believed to have slipped into the jejunum. The instrument was withdrawn about 4 or 5 inches and air was introduced. The stoma and the remaining portion of the stomach appeared much the same as on the previous examination. No evidence of a malignant growth was seen. The whole examination was carried out without any difficulty. Immediately after the examination the patient complained of a feeling of distention and faintness. No shoulder pain was noted by the patient. She remained in bed in the outpatient department for about an hour and as she said she felt better she was allowed to go home. Close to 5 o'clock the same day she returned to the emergency department complaining of the same distention and generalized pain in the abdomen. A roentgenogram of the abdomen taken with the patient on her left side showed a large amount of air under the right diaphragm.

Laparotomy was performed by Dr. Christopher D'Amanda, senior surgeon in the ward surgical service, approximately nine hours after perforation. Free air escaped as soon as the peritoneum was opened, and the abdomen flattened out. Exploration through the mesocolon in the lesser sac revealed a perforation about the size of a dime (18 mm.) on the posterior surface of the jejunum 2 inches away from the stoma, as shown in the accompanying illustration. The perforation was closed and the edges were invaginated. No evidence of peritonitis could be seen, nor were there any metastatic lesions notable. The patient recovered from this insult remarkably well and was asking for a full course meal on her second postoperative day. There was a low grade fever for five days, but the temperature returned to normal and she was discharged on her fifteenth postoperative day feeling fine.



Point on posterior surface of jejunum at which perforation occurred.

COMMENT

The incidence of this type of perforation is very small and should in no way influence one's faith in the gastroscope as a diagnostic aid; however, it has changed my method of introduction in patients who have had a resection. I believe that one had better be on the safe side and stop the introduction of the instrument at a point where the examiner believes he will best see the stoma. The one important and interesting factor in this case is that all gastroscopic signs of perforation were lacking. Usually the stomach collapses and one is unable to see very much because no air can be introduced. The stomach retained air sufficiently for me to see practically the entire mucosa in this case.

This perforation occurred in the 112th gastroscopy that I have done since October 1938. I feel that the technic that has been followed is in accord with the teachings of Dr. Schindler. The only other question that can be raised is whether the tissue at the point of perforation was normal. No biopsy was taken; it appeared normal to the surgeon, however. With these possibilities eliminated, the only conclusion that one can draw is that this perforation occurred with reasonably good technic and through normal tissue.

17 South Goodman Street.

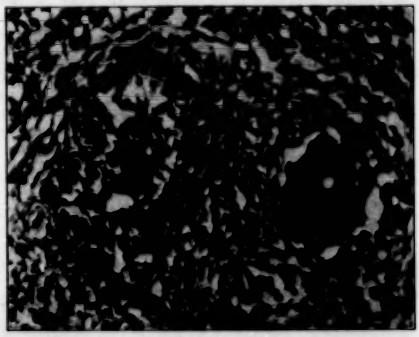
COCCIDIOIDAL PERITONITIS: DIAGNOSIS BY PERITONEOSCOPY

JOHN C. RUDDOCK, M.D., AND ROBERT B. HOPE, M.D.
LOS ANGELES

This case is unique in that it is the first case of coccidioidal peritonitis reported in the literature in which a diagnosis was proved before death. Coccidioidal granuloma is a rare disease and one peculiar to the San Joaquin Valley in California. The first human infection was reported by Wernicke [1] in 1892, and the organism was described as a protozoa. In 1900 Ophuls and Moffitt [2] proved that the infection known as coccidioidal granuloma was due to a mold (Coccidioides immitis) and were able to grow it on culture mediums. Many reports have appeared since this date.

The similarity of this disease to tuberculosis is noted repeatedly in the literature. This similarity exists in its clinical manifestations and body reactions to the infection. Coccidioidal infections often are miliary and it is impossible without a biopsy or culture of the organism to differentiate them clinically or by roentgenogram from tuberculosis. The x-ray appearance of bone lesions is identical with the appearance of lesions caused by the tubercle bacillus.

Although coccidioidal infections have identical clinical manifestations with tuberculosis, nevertheless intestinal and peritoneal infections seldom occur and are rarely seen. Greaves [3] has reported the only case of intestinal infection, which he demonstrated post mortem in a Negro dying of miliary coccidioidal granuloma. Ophuls [4] in 1929 stated that "intestinal lesions have never been discovered in coccidioidal granuloma."



Section of tissue.

The following case report demonstrates the value of peritoneoscopy in determining intraperitoneal disease, and the value of obtaining a biopsy.

History.—Y. S., a man aged 35, Japanese, single, entered the hospital Dec. 23, 1937, complaining of swelling of the abdomen and pain in the abdomen of two weeks' duration. Two weeks before entry he began to have pain in the epigastrium. With the onset of pain his abodmen had begun to swell and was progressing in size. Loss of weight was slight. He did not have fever or chills. He did not vomit but had occasional nausea; no hematemesis or melena was present. There had been no symptoms of cardiac or respiratory disease. No jaundice was observed.

The patient was born in the Hawaiian Islands; he had lived in and about Los Angeles for the past eleven years. The patient stated that he had not resided in the San Joaquin Valley. He had a lesion of the penis in 1936 for which he received no treatment. For the past four years he had been a heavy user of alcohol, drinking both beer and whisky.

No history of familial diseases was given.

Examination.—The temperature was 99.6 F., pulse 96, respiration 20 and blood pressure 140 systolic, 100 diastolic. The patient was poorly nourished, showing recent loss of weight. There were no petechiae or cutaneous eruptions. The teeth were carious. The tongue was coated. There were palpable epitrochlear and cervical lymph glands. The chest was resonant throughout, expansion was equal and the bases moved normally. There were no rales, but hoarse breath sounds were heard at the right base. The heart showed no enlargement, regular rhythm and no murmurs. The abdomen was distended and tense with a definite fluid wave; no masses or organs were palpable. There was pitting edema of the ankles, grade 2.

The Wassermann reaction was negative. Blood examination revealed hemoglobin 75 per cent, red blood cells 3,830,000, white blood cells 13,500, neutrophils 85 per cent, mononuclears 6 per cent, lymphocytes 9 per cent, no pathologic cells. Sedimentation time was 63 mm. in one hour uncorrected, 25 mm. in one hour corrected. Packed cell volume was 28. The urine was normal.

The clinical diagnosis was atrophic cirrhosis (Laënnec).

December 24, paracentesis was done and 4,000 cc. of straw colored fluid was removed. The patient continued to have a low grade fever and to develop more ascites.

December 30, peritoneoscopy revealed dense adhesions of the omentum to the epigastric peritoneal surfaces. All peritoneal surfaces were covered with miliary tubercles. The liver and gallbladder were normal. A section of peritoneum containing tubercles was removed for biopsy. The abdominal cavity was filled with oxygen.

The impression was probable tuberculous peritonitis, but final diagnosis awaited the result of biopsy.

The pathologic examination of the tissue revealed tubercle-like nodules containing Coccidioides immitis. Culture of the peritoneal fluid yielded Coccidioides immitis. Immediately following peritoneoscopy an x-ray examination of the chest was reported negative.

Course.—Ascites returned and the patient had to have paracentesis performed from time to time. He had a septic temperature of from 100 to 102 F. and failed steadily. Jan. 21, 1938, he suddenly began to have dyspnea and for the first time discomfort in the chest. Examination revealed the typical signs of a bilateral pleural effusion. The fluid was aspirated and Coccidioides immitis was demonstrated by culture.

The patient died January 25.

Autopsy.—January 27, the left pleural space was found to contain 1,000 cc. of straw colored fluid, the right, 1,100 cc. The parietal pleura was studded with granulomatous tubercles. The lungs externally were studded with a granulomatous, fibrinous exudate. Tiny tubercles were seen in the parenchyma. The tracheobronchial lymph nodes were only slightly enlarged.

When the peritoneum was opened the entire cavity and intestines were seen to be covered with a thick layer of plastic exudate, which was diffusely infiltrated with nodular granulomatous tubercles, averaging from 0.5 to 1 cm. thick and extending from over the diaphragm to the pelvis. The greater omentum was from 1 to 2 cm. thick and densely infiltrated. The wall of the lesser curvature of the stomach was infiltrated from the external surface inward by granulomatous tissue. The lymph glands in this area were greatly enlarged and caseous, averaging 2 to 4 cm. in diameter. The duodenum, the small intestine and the large intestine were covered with the same thick granulomatous tissue. The mesentery was infiltrated and the glands were enormously enlarged, up to 4 cm. in diameter. Wet smears showed many Coccidioides immitis organisms.

The liver and spleen showed some infiltration with granulomatous tissue and tubercles.

The left kidney showed a small collection of tubercles on cross section. The bladder showed infiltration with granulomatous tissue.

The anatomic diagnosis was (1) coccidioidal granuloma; (2) coccidioidal lymphadenitis, generalized; (3) coccidioidal perito-

From the Department of Peritoneoscopy, Los Angeles County General Hospital.

1. Wernicke, R.: Ueber einen Protozoenbefund bei Mycosis Fungoides, Centralbl. f. Bakt. **12**: 859 (Dec.) 1892.
2. Ophuls, William, and Moffitt, H. C.: A New Pathogenic Mold, Philadelphia M. J. **5**: 1471, 1900.
3. Greaves, F. C.: Coccidioidal Granuloma with Lesion in Small Intestine, U. S. Nav. M. Bull. **32**: 201 (April) 1934.
4. Ophuls, William, in discussion on Coccidioidal Granuloma, J. A. M. A. **93**: 1053 (Oct. 5) 1929.

nitis, generalized; (4) coccidioidal pleuritis, bilateral with effusion; (5) coccidioides of spleen; (6) coccidioides, miliary, of liver; (7) coccidioides of left kidney.

The clinical course with the development of ascites and a history of alcoholism supported a diagnosis of cirrhosis. The conditions as noted with the peritoneoscope were similar to those of tuberculosis of the peritoneal cavity, and oxyperitoneum was instituted as a treatment procedure. Differential diagnosis between tuberculosis and coccidioidal granuloma is not possible without biopsy or culture. A biopsy of the parietal peritoneum and a culture of the fluid revealed Coccidioides immitis, thus establishing the diagnosis.

The technic of the procedure of peritoneoscopy is described in detail in previous papers by us.[5]

2202 West Third Street.

INHALATION OF MASSIVE AMOUNTS OF VEGETAL FOREIGN BODIES

W. A. McNICHOLS, M.D., DIXON, ILL.

On July 4, 1939, a girl aged 7 years jumped from a load of hay into a bin of finely ground dry feed containing oats, wheat, corn and corncobs. She sank into this mixture as though it were a liquid, being completely submerged with the exception of one hand. Her brother saw her jump and then he heard two frightened cries. He summoned their father, who with great difficulty was able to extricate her. It is believed that she was submerged for at least ten minutes.

When she was removed from the bin she was cyanotic, unconscious and not breathing. Her mother, who had had nurses' training, cleaned out her daughter's nose and mouth and gave her artificial respiration. Breathing was restored, but it was very rapid and shallow and the cyanotic condition did not improve.

Drs. D. L. Murphy and R. L. Baird, of Dixon, five miles distant, were summoned. They could not obtain breath sounds anywhere over the patient's chest. They wisely elected to move her to the Dixon Public Hospital, where they would have oxygen and bronchoscopic assistance.

The patient arrived at the hospital approximately thirty-five minutes after she jumped into the bin. She was unconscious and cyanotic and had rapid stridulous breathing; the pulse was thready and not countable; no breath sounds were audible anywhere over the chest, and the rate of diaphragmatic movement was from 70 to 80 per minute.

Oxygen was immediately administered by mouth through a catheter. Drs. Murphy and Baird felt that any new insult to the lung would be fatal, so they asked me to do a dry tracheotomy rather than risk losing foreign bodies at the glottis. This we did without anesthesia, all bleeding being stopped before the trachea was opened. The tracheotomy did not improve the patient's condition.

A 5 mm. bronchoscope was inserted through the tracheotomy wound. The trachea was filled with a mushy viscid fluid. After aspiration of the fluid, the bronchoscope was filled with many vegetal foreign bodies. The condition of the trachea proved my colleagues' good judgment in not using a life saver tube or attempting an emergency tracheotomy, as either procedure would have been futile and probably disastrous.

In one hour and twenty minutes, 3¼ drachms (15 Gm.) by volume of oats, wheat, corn and corncobs was removed from the tracheobronchial tree. Five pieces of corncob that were too large to go through the 5 mm. bronchoscope were removed. It was necessary to remove the instrument many times to clean it of the mushy débris. As the bronchi were cleaned out, breath sounds would appear over the corresponding areas. All this time oxygen was being given into the trachea.

Finally no more foreign bodies could be found. The trachea was stitched open with silkworm sutures anchored to the skin. No tube was used. Thus the patient was able to cough out the viscid mucus and foreign bodies.

She was placed in bed with the foot of the bed elevated and oxygen blowing into her trachea. The cyanosis had completely disappeared and breath sounds could be heard over the entire chest. The temperature was 102.8 F., the pulse rate 134, the respiratory rate 40 and the white blood cell count 21,300. Two hours later the child was conscious and able to take liquid nourishment.

The tracheobronchial tree was aspirated as needed, which was at least hourly. From the tracheotomy wound one whole oat kernel was recovered, and the suction apparatus brought out many finer pieces of grain.

The second evening the patient had a chill, with the temperature 103 F., pulse rate 156 and respiratory rate 60. The mucus was blood stained, and pneumococcus type III was found in it. She was given 5 minims (0.3 cc.) of digitalis every four hours for three doses, and 7½ grains (0.5 Gm.) of sulfapyridine, one-eighth grain (0.008 Gm.) of phenobarbital and 5 grains (0.3 Gm.) of sodium bicarbonate every four hours. She immediately improved, but after the tenth dose she began vomiting the medicine and refusing food, so all medication was stopped. By this time her temperature was 100 F., pulse rate 96 and respiratory rate 36. Her appetite returned as soon as the sulfapyridine was discontinued.

On the sixth day, with the temperature 100 F., pulse rate 84 and respiratory rate 32, x-ray examination of the lungs showed them to be clear. A bronchoscope was again inserted and a careful search was made of the tracheobronchial tree for vegetal foreign bodies, but none were found.

On the seventh day, with the temperature 98.6 F., pulse rate 76 and respiratory rate 20, the stitches were removed from the trachea and it was allowed to close. The patient was discharged on the ninth day. She has been seen from time to time, and she is perfectly well.

CONCLUSIONS

1. Inadvisable use of life saver tubes or emergency tracheotomies may frequently be of more harm than good.
2. Oxygen is a great adjunct in treatment in all cases of air deficiency.
3. Sulfapyridine may control nicely an otherwise fatal tracheobronchitis.

101 West First Street.

SEVERE ALLERGIC DERMATITIS FOLLOWING THE PARENTERAL USE OF THEELIN

LOUIS A. LEVISON, M.D., TOLEDO, OHIO, AND JULIAN J. HARRISON, M.D., NAPOLEON, OHIO

The following case seems worthy of being reported because of its rarity and the severity of the reaction.

Mrs. W. G. M., aged 51, a housewife, white, had been under the observation of one of us (J. J. H.) for several months before admission to St. Vincent's Hospital Dec. 29, 1938. She had been experiencing emotional disturbances incidental to the menopause, and a course of treatment with theelin had been proposed and put into effect. She entered the hospital on account of a marked painful, red, erythematous, swollen involvement of the skin over the anterior surface of each thigh. She stated that she had never had any similar skin trouble, and there was no history of allergic dermatitis, hay fever, asthma or food intolerance. The history revealed diphtheria at 4, a pelvic operation at 32 and a left-sided renal calculus removed at operation at the Mayo Clinic at 35. She had three children, who were living and well. A careful inquiry revealed no allergic antecedents.

The cutaneous lesions had first appeared four weeks prior to the hospital admission and during the course of a series of parenterally administered theelin beginning about Nov. 10, 1938. She had been given eight injections of theelin (Parke, Davis & Co.), each 2,000 units, over the anterior aspect of the left thigh, and one injection of estrone (Eli Lilly & Co.) 2,000 units in the same relative area of the opposite side. The injections were rather painful and itched from the outset, with the redness and rash noticeably apparent at the fourth or fifth treatment. This troublesome and distressing reaction progressively

5. Ruddock, John C.: Peritoneoscopy, West. J. Surg. 45:392 (July) 1934; Surg., Gynec. & Obst. 65:623 (Nov.) 1937. Hope, Robert B.: Differential Diagnosis of Ectopic Gestation by Peritoneoscopy, ibid. 64:229 (Feb.) 1937.

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increased in severity and area during the remainder of the course of treatments.

Examinations before and after the hospital admission did not reveal relevant manifestations other than the cutaneous condition. Her complaints were subjective, indicating the emotional and nervous instability mentioned. The skin over the anterior surface of each thigh was red and swollen, itched and was markedly erythematous. Superimposed on this angry appearing erythema were many small papules and occasional small vesicles. The greatest intensity of the inflammation on each thigh centered at the point of hypodermic injections midway between the hip and the knee. Practically the entire anterior

Extensive involvement of both legs after parenteral use of theelin.

aspect of each thigh was involved on the date of her hospital admission. The erythema spread rapidly while she was in the hospital, quickly progressing at each area of involvement to an appearance characteristic of allergic dermatitis. It reached such distant points as the ankles and neck by the fourth day. The skin was not uniformly involved but the reaction was most severe over the thighs, both ankles and the lateral aspects of the neck on each side. There was, however, general erythema of all body areas. Both ankles showed considerable swelling with a 2 plus pitting edema. There was no involvement of the mucous membrane. The itching was extreme and at times almost intolerable, doubtless accentuated by the nervous and emotional instability. Fever was not present, the urine remained normal, and the eosinophil count of the blood never exceeded 3 per cent.

Treatment consisted of palliative measures with most relief from a constantly applied lotion containing calamine, menthol, camphor, zinc oxide and solution of calcium hydroxide. Starch baths in a full tub were given several times a day. Hot or cold compresses of saturated solution of aluminum acetate were not apparently helpful. Olive oil relieved the subsequent dryness of the skin.

The patient returned to her home on the eleventh day after admission to the hospital with the cutaneous lesions greatly improved. The generalized pruritus persisted and was very troublesome. The lotion and starch baths gave relief until its subsidence several weeks later.

Inquiry of Eli Lilly & Co. revealed that the fatty solvent used in the marketed ampule was highly purified cottonseed oil, and in the product of Parke, Davis & Co. (theelin) it was peanut oil. The patient had received eight injections of the peanut oil product prior to the single injection of the cottonseed oil preparation. Each company supplied samples of the respective oils used. Patch and scratch tests of each oil were later made on the patient and gave negative results. Later, intradermal tests were made on the flexor surface of each forearm, peanut oil being used on the one side and cottonseed oil on the other. The reaction to each was unmistakable, immediate, severe and widespread. There was a large area of swelling, redness and erythema on each side, spreading over the entire flexor surface of the arm. There was no appreciable difference in the degree or extent of area involved on either side. A few days later scattered areas of involvement appeared over the skin generally, especially on the legs, trunk and neck. The lesions were entirely comparable with the original trouble. A severe and generalized pruritus followed in the same manner as before, responding to the same management.

We have not found in the material available to us references to dermatitis of allergic origin following the parenteral administration of theelin (estrone) in oil. Inquiry among physicians in this community with wide and extensive experience has not supplied a similar instance. It is probably infrequent, although allergic responses of one type or another are not rare or unusual following the use of cottonseed oil by ingestion in the preparation of food. It does not appear that the estrogenic substance itself was a factor in this reaction. Earlier recognition of similar cases will permit substitution of other methods of administration, such as water soluble preparations, tablets or suppositories.

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Council on Pharmacy and Chemistry

PRELIMINARY REPORT ON VITAMIN K: II

SINCE THE PUBLICATION OF A PRELIMINARY REPORT ON VITAMIN K BY ALBERT M. SNELL IN THE JOURNAL FOR APRIL 15, 1939, THERE HAS BEEN WITNESSED INTENSE INTEREST IN ATTEMPTS TO ISOLATE COMPOUNDS HAVING VITAMIN K ACTIVITY. VERY DEFINITE PROGRESS HAS BEEN MADE IN ESTABLISHING THE CHEMICAL NATURE OF NATURALLY OCCURRING COMPOUNDS, AND MANY SYNTHETIC PREPARATIONS HAVING VITAMIN K ACTIVITY HAVE BEEN PREPARED. SINCE FURTHER EVIDENCE OF THE THERAPEUTIC VALUE OF VITAMIN K PREPARATIONS IS ALSO ACCUMULATING IT SEEMED DESIRABLE TO HAVE A FURTHER REVIEW OF THIS SUBJECT. THE FOLLOWING PAPER HAS BEEN PREPARED BY THE AUTHORS AT THE REQUEST OF THE COUNCIL, AND THE COUNCIL HAS AUTHORIZED ITS PUBLICATION. DURING THE PAST FEW MONTHS THE COUNCIL HAS CONDUCTED EXTENSIVE CORRESPONDENCE RELATING TO THE ADOPTING OF A SUITABLE NONPROPRIETARY NAME FOR VITAMIN K. NAMES WHICH ARE ACCEPTABLE TO THE COUNCIL HAVE BEEN PROPOSED BUT THE COUNCIL IS NOT PREPARED TO MAKE A DEFINITE RECOMMENDATION UNTIL CERTAIN MATTERS RELATING TO PRIORITY HAVE BEEN SETTLED.

PAUL NICHOLAS LEECH, Secretary.

SUPPLEMENTARY REPORT ON VITAMIN K

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In April 1939 a report on the sources, nature and clinical use of vitamin K was prepared by one of us (Snell [1]) at the request of the Council on Pharmacy and Chemistry. Since the publication of this report, attention has been called to inaccuracies in the matter of defining a unit of the vitamin. Certain investigators have also questioned some of the statements made with regard to the fundamental causes of deficiency in prothrombin, the methods of recognizing them and the means of dealing with them. This supplementary report has been prepared in an effort both to clarify these matters and to bring up to date the present knowledge of the chemical nature of the vitamin.

DEFINITION OF A UNIT

The Dam unit of activity as defined in some detail in an article by Dam and Glavind [2] refers to a special preparation of dried spinach, to which a value of 500 units per gram has been arbitrarily assigned. Two mg.

From the Division of Medicine, the Mayo Clinic.

1. Snell, A. M.: Vitamin K: Its Properties, Distribution and Clinical Importance: A Preliminary Report, J. A. M. A. 112: 1457-1459 (April 15) 1939.

2. Dam, Henrik, and Glavind, Johannes: Determination of Vitamin K by the Curative Blood-Clotting Method, Biochem. J. 32: 1018-1023 (June) 1938.

of this product therefore constitutes one unit. When 2 mg. (1 unit, not 1 mg. as was incorrectly written in the earlier report to the Council) of this standard preparation per gram of body weight is given daily to a highly K-avitaminous chick on three successive days, normal blood clotting is obtained.

Personal communications with Dann [3] indicate that her unit of vitamin K is the amount of material, based on a standard of known potency, which when administered to chicks daily will bring about a coagulation time of the blood equal to that produced by the reference standard under the conditions of the test. The reference standard is a special extract of alfalfa which has been shown to be stable over a long period.[4]

Other investigators, including Ansbacher,[5] have attempted to establish a definition of a unit of vitamin K. Ansbacher's unit is established as "the minimum amount [of vitamin K] necessary to render the blood clotting time of the vitamin K-deficient chick, weighing 70 to 100 Gm., normal within six hours after administration." One of Ansbacher's units is equivalent to 20 Dam units. Thayer and his associates [6] define a unit of vitamin K as "that quantity of vitamin [K] which produces a clotting time of ten minutes or less in 50 per cent of a group of ten or more chicks which has been fed for the fourteen days immediately following receipt from the hatchery on a diet practically devoid of vitamin K."

Almquist and his associates [7] have also presented a method of assay of vitamin K, showing that "the reciprocal of the blood clotting time is a simple linear function of the logarithm of the level of the vitamin K level in the ration." Obviously, there is not complete agreement among these investigators working in the same field of biology as to the manner of defining a unit or as to the best methods of assay. While freely admitting the inadequacies of this definition of the unit in the report prepared for publication by the Council on Pharmacy and Chemistry, we are of the opinion that any attempt arbitrarily to establish such a unit of the vitamin is unlikely to suit all investigators. Indeed, it would seem wise to postpone consideration of units, since exact and final knowledge of the chemical structure of substances exhibiting antihemorrhagic activity now is close at hand.

THE CHEMICAL NATURE OF VITAMIN K

In the earlier report to the Council,[1] three of the earlier studies designed to accomplish the purification and isolation of the vitamin were cited. In the light of subsequent developments, these earlier reports can now be omitted from consideration. Recently Almquist and Klose [8] have prepared a choleic acid derivative, which is a yellow, crystalline substance with a melting point of 186 C. Vitamin K can be separated from this material as a viscous, slightly pigmented oil. Cohn and Schmidt [9] have shown this preparation to be most effective in increasing low prothrombin values in rats that have biliary fistulas. Dam and his collaborators [10] also have recently prepared, by a process of molecular distillation and chromatographic methods, a constant product of high purity which they believed to be pure vitamin K. The material, which is a clear yellowish oil, contains carbon, hydrogen and oxygen and is nitrogen free. Elementary analysis has indicated the presence of two atoms of oxygen in the molecule; a tentative composition of carbon 82.2 per cent and hydrogen 10.7 per cent has been established. This material is said to be extremely potent on biologic assay, containing about 20,000,000 Dam units per gram.

In an earlier report the prediction was made that several closely related substances having antihemorrhagic properties were likely to be found in crude extracts of alfalfa or putrefied fish meal. It is in investigations of the type suggested by such a prediction that developments of great importance are now taking place. In May 1939 McKee and his associates [11] reported the isolation of vitamins K_1 (from alfalfa) and K_2 (from putrefied fish meal) and presented evidence to indicate a quinoid structure for these vitamins; further work has substantiated these preliminary statements.[12] Almquist and Klose [13] recently have reported that phthiocol (2-methyl-3-hydroxy-1,4-naphthoquinone) possesses physical and chemical properties similar to pure vitamin K.[13a] Phthiocol was first isolated by Anderson and Newman [14] from the pigment of Mycobacterium tuberculosis; its synthesis was announced in 1934.[15] It has been shown by Almquist and Klose [13] that phthiocol is effective in preventing hemorrhagic diathesis in chicks subsisting on a K-deficient diet when phthiocol is given at 20 mg. per kilogram of diet. They have also suggested that phthiocol is the simplest member of a homologous series of antihemorrhagic substances. Later these investigators [16] reported that the antihemorrhagic activity of phthiocol lay somewhere between that of methyl naphthoquinone and hydroxy naphthoquinone. Their study indicated that the methyl group was functionally important whereas the hydroxyl group seemed to reduce activity. They agreed that the activity of phthiocol is lower than the more complex form of vitamin K existing in alfalfa; Ansbacher and Fernholz [17] were of a similar opinion. The use of phthiocol in the correction of prothrombin deficiency in chicks has been studied in detail by Almquist and Klose; [13] clinical studies with this material will be mentioned later in this report.

3. Dann, Flementine P.: Personal communication to the authors.
4. Further details of this method are to be published shortly.
5. Ansbacher, S.: A Quantitative Biological Assay of Vitamin K, J. Nutrition **17**: 303-315 (April) 1939.
6. Thayer, S. A.; McKee, R. W.; Binkley, S. B.; MacCorquodale, D. W., and Doisy, E. A.: Assay of Vitamin K Concentrates, Proc. Soc. Exper. Biol. & Med. **40**: 478-481 (March) 1939.
7. Almquist, H. J.; Mecchi, E., and Klose, A. A.: Estimation of the Antihemorrhagic Vitamin, Biochem. J. **2**: 1897-1903 (Nov.) 1938.
8. Almquist, H. J., and Klose, A. A.: The Isolation of Vitamin K as a Choleic Acid, J. Am. Chem. Soc. **61**: 745-746 (March) 1939.
9. Cohn, E. T., and Schmidt, C. L. A.: Effect of Choleic Acid of Vitamin K on Prothrombin Levels of Bile Fistula Rats, Proc. Soc. Exper. Biol. & Med. **41**: 443-444 (June) 1939.
10. Dam, Henrik; Geiger, A.; Glavind, J.; Karrer, P.; Karrer, W.; Rothschild, E., and Salomon, H.: Isolierung des Vitamins K in hochgereinigter Form, Helvet. chim. acta. **22**: 310-313, 1939.
11. McKee, R. W.; Binkley, S. B.; MacCorquodale, D. W.; Thayer, S. A., and Doisy, E. A.: The Isolation of Vitamins K_1 and K_2, J. Am. Chem. Soc. **61**: 1295 (May) 1939.
12. Binkley, S. B.; MacCorquodale, D. W.; Cheney, L. C.; Thayer, S. A.; McKee, R. W., and Doisy, E. A.: Derivatives of Vitamins K_1 and K_2, J. Am. Chem. Soc. **61**: 1612-1613 (June) 1939.
13. Almquist, H. J., and Klose, A. A.: The Antihemorrhagic Activity of Pure Synthetic Phthiocol, J. Am. Chem. Soc. **61**: 1611 (June) 1939.
13a. It has been thought that phthiocol owes its activity to contamination with some impurity, presumably 2-methyl-1,4-naphthoquinone. However, the most recent report of Fernholz and Ansbacher (Vitamin K Activity of Synthetic Phthiocol, Science **90**: 215 [Sept. 1] 1939) indicates that even after purification, synthetic phthiocol has antihemorrhagic properties. In this same report they also noted the powerful curative effect of 2-methyl-1,4-naphthoquinone in chicks deficient in vitamin K.
14. Anderson, R. J., and Newman, M. S.: The Chemistry of the Lipids of Tubercle Bacilli: XXXIV. Isolation of a Pigment and of Anisic Acid from the Acetone-Soluble Fat of the Human Tubercle Bacillus, J. Biol. Chem. **101**: 773-779 (Aug.) 1933; The Chemistry of the Lipids of Tubercle Bacilli: XXXV. The Constitution of Phthiocol, the Pigment Isolated from the Human Tubercle Bacillus, ibid. **103**: 197-201 (Nov.) 1933.
15. Newman, M. S.; Crowder, J. A., and Anderson, R. J.: The Chemistry of the Lipids of Tubercle Bacilli: XXXVIII. A New Synthesis of Phthiocol, the Pigment of the Human Tubercle Bacillus, J. Biol. Chem. **105**: 279-281 (May) 1934.
16. Almquist, H. J., and Klose, A. A.: The Antihemorrhagic Activity of Certain Naphthoquinones, J. Am. Chem. Soc. **61**: 1923-1924 (July) 1939.
17. Ansbacher, S., and Fernholz, Erhard: Simple Compounds with Vitamin K Activity, J. Am. Chem. Soc. **61**: 1924-1925 (July) 1939.

Recently Thayer and his associates,[18] as well as MacCorquodale and his co-workers,[19] working in Doisy's Laboratory at St. Louis University Medical School, have found 2 methyl-1,4-naphthoquinone the most active compound studied, but when this compound was compared with the natural vitamins K_1 and K_2 its activity was relatively insignificant. They believed the structure of the vitamin K_1 molecule to be 2-ethyl-3-phytyl-1,4-naphthoquinone. Fieser and his co-workers [20] suggested that the structure of K_1 was 2,6 (?)-dimethyl-3-phytyl-1,4-naphthoquinone (or the 2-mono-methyl compound) and that that of vitamin K_2 was 2,3-difarnesyl-1,4-naphthoquinone.

Further work by Binkley, MacCorquodale, Thayer and Doisy [21] at St. Louis University Medical School has confirmed, through synthesis, the structural formula of vitamin K. Their experiments demonstrate conclusively that the structure of vitamin K_1 is correctly represented by the formula 2-methyl-3-phytyl-1,4-naphthoquinone. This work has been further confirmed by Fieser, Campbell, Fry and Gates,[22] who described the synthesis of vitamin K_1.

Since the activity of 2-methyl-1,4-naphthoquinone is approximately equal to that of pure vitamin K_1, Thayer, Binkley, MacCorquodale, Doisy, Emmett, Brown, and Bird [23] have suggested that it be adopted as a basic standard for assay of vitamin K. The compound does have desirable qualities for standardization in that it can be obtained readily in a satisfactory state of purity, has a definite melting point for characterization and, when protected from excessive exposure to light, is readily stable. They suggested that by adopting this substance as the standard for assay the unit could then be defined in terms used by the League of Nations committee as the specific vitamin K activity of 1 microgram of pure 2-methyl-1,4-naphthoquinone.

THE GENERAL CLINICAL CAUSES OF DEFICIENCY IN PROTHROMBIN

In the earlier report the methods of Quick, of Dam and his co-workers and of Warner, Smith and Brinkhous were mentioned. The method of Quick has found favorable reception in this country and is now widely used as a routine method for determining deficiency in prothrombin in hospital practice; Dam and Glavind still prefer their modification of Fisher's method. Ziffren and his co-workers [24] have recently described a simple "bedside" method of comparing the clotting time of normal blood to that of the specimen in question after thromboplastin has been added to each. The unknown is expressed in percentage of the normal.

The principal clinical points to be emphasized here are: (1) that whichever of these methods for determining deficiency in prothrombin is to be employed most effectively depends somewhat on the experience and the facilities of the physician concerned; (2) that the nature of prothrombin is unknown and that all methods of measurement thus far proposed are open to some objections on this score, and (3) that the simpler the method used, the more likely it is to be used as frequently as is necessary in the care of patients who have actual or impending hemorrhagic tendencies.

THE GENERAL CLINICAL CAUSES OF DEFICIENCY IN PROTHROMBIN

Several investigators have reported a number of conditions in which there exists a deficiency of prothrombin which can be corrected by the administration of vitamin K. Hypoprothrombinemia among human beings apparently may occur in any of the following circumstances:

1. After ingestion of a diet inadequate in vitamin K. Hypoprothrombinemia from this cause is being reported by Kark and Lozner; [25] their patients responded adequately to the administration of vitamin K. This clinical observation is well supported by the experimental production of low blood values for prothrombin in rabbits (Dam and Glavind [26]), in rats (Greaves [27]) and in mice (Murphy [28]) following the administration of diets deficient in vitamin K.

2. In newborn infants. Waddell and Guerry [29] have recently reported that among newly born infants there is not infrequently a deficiency of prothrombin which responds to the administration of vitamin K by mouth. The mechanism of this type of prothrombin deficiency is not entirely clear, although it is suggested that such a deficiency might be corrected by the administration of vitamin K to mothers before delivery.

3. With inadequate intestinal absorption. This may result from: (*a*) lack of bile in the intestine due to a poor secretion of bile salts, to (*b*) an obstruction of the bile ducts from any cause, or to (*c*) inadequate absorption due to various intestinal lesions, including short-circuiting surgical procedures and intestinal obstruction. All these various factors have been demonstrated among patients by Osterberg and us [30] and by Clark and his associates.[31] It has likewise been demonstrated that severe diarrheal diseases, such as ulcerative colitis, sprue or celiac disease, may result in a deficiency in prothrombin.

4. Injury to the liver. There is considerable evidence, clinical and experimental, to indicate that the liver plays an active part in the formation of prothrombin. It must be admitted that some of this evidence is largely circumstantial. Smith, Warner and Brinkhous [32] have shown

18. Thayer, S. A.; Cheney, L. C.; Binkley, S. B.; MacCorquodale, D. W., and Doisy, E. A.: Vitamin K Activity of Some Quinones, J. Am. Chem. Soc. **61**: 1932 (July) 1939.
19. MacCorquodale, D. W.; Binkley, S. B.; Thayer, S. A., and Doisy, E. A.: On the Constitution of Vitamin K_1, J. Am. Chem. Soc. **61**: 1928-1929 (July) 1939.
20. Fieser, L. F.; Bowen, D. M.; Campbell, W. P.; Fieser, Mary; Fry, E. M.; Jones, R. N.; Riegel, Byron; Schweitzer, C. E., and Smith, P. G.: Quinones Having Vitamin K Activity, J. Am. Chem. Soc. **61**: 1925-1926 (July) 1939.
21. Binkley, S. B.; MacCorquodale, D. W.; Thayer, S. A., and Doisy, E. A.: The Isolation of Vitamin K_1, J. Biol. Chem. **130**: 219-234 (Sept.) 1939.
22. Fieser, L. F.; Campbell, W. P.; Fry, E. M., and Gates, M. D., Jr.: Synthetic Approach to Vitamin K_1, J. Am. Chem. Soc. **61**: 2559 (Sept.) 1939.
23. Thayer, S. A.; Binkley, S. B.; MacCorquodale, D. W.; Doisy, E. A., and Emmett, A. D.; Brown, R. A., and Bird, O. D.: Vitamin K Potencies of Synthetic Compounds, J. Am. Chem. Soc. **61**: 2563 (Sept.) 1939.
24. Ziffren, S. E.; Owen, C. A.; Hoffman, G. R., and Smith, H. P.: Control of Vitamin K Therapy: Compensatory Mechanisms at Low Prothrombin Levels, Proc. Soc. Exper. Biol. & Med. **40**: 595-597 (April) 1939.
25. Kark, Robert, and Lozner, E. L.: Personal communication to the authors.
26. Dam, Henrik, and Glavind, Johannes: The Clotting Power of Human and Mammalian Blood in Relation to Vitamin K, Acta med. Scandinav. **90**: 108-128, 1938.
27. Greaves, J. D.: Studies on the Vitamin K Requirements of the Rat, Am. J. Physiol. **125**: 429-436 (March) 1939.
28. Murphy, Rosemary: Possible Avitaminosis K Produced in Mice by Dietary Means, Science **89**: 203-204 (March 3) 1939.
29. Waddell, W. W., Jr., and Guerry, Du Pont: Effect of Vitamin K on the Clotting Time of the Prothrombin and the Blood, with Special Reference to Unnatural Bleeding of the Newly Born, J. A. M. A. **113**: 2259-2263 (June 3) 1939.
30. Butt, H. R.; Snell, A. M., and Osterberg, A. E.: The Use of Vitamin K and Bile in Treatment of the Hemorrhagic Diathesis in Cases of Jaundice, Proc. Staff Meet., Mayo Clin. **13**: 74-80 (Feb. 2) 1938; Further Observations on the Use of Vitamin K in the Prevention and Control of the Hemorrhagic Diathesis in Cases of Jaundice, ibid. **13**: 753-764 (Nov. 30) 1938. Footnote 32.
31. Clark, R. L., Jr.; Dixon, C. F.; Butt, H. R., and Snell, A. M.: Deficiency of Prothrombin Associated with Various Intestinal Disorders: Its Treatment with the Antihemorrhagic Vitamin (Vitamin K), Proc. Staff Meet., Mayo Clin. **14**: 407-416 (June 28) 1939.
32. Smith, H. P.; Warner, E. D., and Brinkhous, K. M.: Prothrombin Deficiency and the Bleeding Tendency in Liver Injury (Chloroform Intoxication), J. Exper. Med. **68**: 801-811 (Dec.) 1937.

that in dogs whose livers have been injured by acute intoxication with chloroform there develops a deficiency in prothrombin with a definite hemorrhagic tendency. More recent work by Warner [33] indicates that extirpation of a large portion of the liver in rats results in a marked decrease in the concentration of prothrombin in the plasma, thus supporting the belief that the liver is perhaps directly concerned in the manufacture of plasma prothrombin. Warren and Rhoads [34] have performed complete hepatectomies in dogs and have noted a rather rapid decrease in the concentration of prothrombin in the plasma following this procedure. They concluded that the liver is essential to the formation of prothrombin in the dog. Their work further supports the contentions previously mentioned.

Clinically we [35] have seen, as has Warner,[36] that primary hepatic disease, such as cirrhosis, atrophy or chronic hepatitis, is not infrequently accompanied by hypoprothrombinemia. We have encountered several patients having primary hepatic damage who, in spite of an adequate diet and ingestion of adequate amounts of bile salts or bile by mouth, continued to exhibit a pronounced deficiency in prothrombin. An occasional patient in such a group as this will not respond even to large doses of concentrates of vitamin K administered orally with bile salts or given intramuscularly. These clinical observations again tend to support the thesis that the liver is intimately connected with the whole process of prothrombin formation.

These recent developments show that there are apparently several conditions other than those previously reported in which a deficiency of prothrombin may be encountered. The conclusion seems justified that at least four basic factors appear to be necessary in the prevention and control of hypoprothrombinemia that may occur among human beings, namely (1) the presence of bile of normal composition in the intestinal tract; (2) a diet containing the vitamin itself or materials from which it can be formed; (3) presence of a normal absorptive surface in the small intestine, and (4) a liver which is capable of performing adequately the synthesis of prothrombin.

METHODS OF ADMINISTRATION

Methods for the oral administration of vitamin K and bile or bile salts in the treatment of deficiency in prothrombin have been described in recent papers in THE JOURNAL.[37]

Dam and his co-workers have shown that definite beneficial effects on patients having a deficiency in prothrombin follow the intramuscular administration of emulsions of vitamin K. At the time of our earlier report we were not able to reproduce the results of Dam and his co-workers by using preparations of vitamin K available to us; we have since fully confirmed their observations. The response to intramuscular administration is distinctly less rapid than that which follows oral administration. Also it is not apparent that any great advantage accrues to the patient by the intramuscular procedure except when the jaundiced individual in question is, for one reason or another, unable to take or absorb the vitamin by mouth. The possible advantage of long-continued slow absorption of injected material must be mentioned. The peroral method of administration has sufficed for the care of the great majority of patients having a deficiency in prothrombin, and in our opinion it is still the best method for general use.

In the treatment of patients who have hypoprothrombinemia, circumstances occasionally arise in which the intravenous administration of vitamin K might be desirable. However, we have felt that to administer intravenously the preparations of vitamin K available to us in the past would have entailed considerable danger to the patient. Recently Dam [38] has administered emulsions of vitamin K intravenously to human beings without the occurrence of untoward reactions. The recent report by Almquist and Klose that phthiocol exhibited antihemorrhagic properties suggests that this compound might be well adapted for parenteral administration and thus might be useful clinically. Smith and his associates [39] of the University of Iowa made a brief report in a note at the conclusion of their recent article in THE JOURNAL concerning the intravenous administration of phthiocol to one patient who had obstructive jaundice, following which there was an increase in the concentration of prothrombin in the plasma.

We have recently reported the intravenous administration of phthiocol to a number of patients having hypoprothrombinemia.[40] To one individual, 100 mg. of the material was administered by mouth together with bile salts, with a resulting elevation in the concentration of prothrombin as measured by the method of Warner and his associates. We have also administered intravenous preparations of phthiocol in doses of from 25 to 50 mg. to nine patients having hypoprothrombinemia. These patients had obstructive jaundice or primary hepatic injury, and one patient had intestinal obstruction. In each instance following the administration of phthiocol there was a reduction in the prolonged Quick prothrombin clotting time.[41] No untoward reactions were noted following the administration of phthiocol in any instance. Whether or not the intravenous use of preparations exhibiting antihemorrhagic activity will replace the oral methods now in general use must await further clinical developments.

CONCLUSIONS

Various phases of the chemical, physiologic, biologic aspects and the clinical usefulness of vitamin K are developing so rapidly that a number of the views expressed in the present report may require modification within a comparatively short time. Therefore it would seem wise at the present moment to withhold any dogmatic statements until the recently developed chemical products exhibiting vitamin K activity have been studied more extensively from biologic and clinical standpoints.

33. Warner, E. D.: Plasma Prothrombin: Effect of Partial Hepatectomy, J. Exper. Med. **68**: 831-835 (Dec.) 1938.
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35. Butt, H. R.; Snell, A. M., and Osterberg, A. E.: The Preoperative and Postoperative Administration of Vitamin K to Patients Having Jaundice, J. A. M. A. **113**: 383-390 (July 29) 1939.
36. Warner, E. D., in discussion on Butt, H. R.; Snell, A. M., and Osterberg, A. E.: Oral and Intramuscular Administration of Vitamin K in Hemorrhagic Diathesis of Obstructive Jaundice, J. A. M. A. **112**: 879-880 (March 4) 1939.
37. Smith, H. P.; Ziffren, S. E.; Owen, C. A., and Hoffman, G. R.: Clinical and Experimental Studies on Vitamin K, J. A. M. A. **113**: 380-383 (July 29) 1939. Butt, Snell and Osterberg.[35]
38. Dam, Henrik: Personal communication to the authors.
39. Smith, H. P.; Ziffren, S. E.; Owen, C. A., and Hoffman, G. R.: Note at the Completion of Article "Clinical and Experimental Studies on Vitamin K," J. A. M. A. **113**: 383 (July 29) 1939.
40. Butt, H. R.; Snell, A. M., and Osterberg, A. E.: Phthiocol: Its Therapeutic Effect in the Treatment of Hypoprothrombinemia Associated with Jaundice: A Preliminary Report, Proc. Staff Meet., Mayo Clin. **14**: 497-502 (Aug. 9) 1939.
41. Since this report was submitted to the Council a synthetic compound, 1,4-dihydroxy-2 methyl-3-naphthaldehyde, has been supplied to us by Dr. E. A. Doisy of St. Louis. When administered intravenously in doses of from 5 to 10 mg. this preparation has been effective in reducing elevated prothrombin times as calculated by the Quick method, in cases of obstructive jaundice. Ten patients have been treated and no untoward reactions have been noted.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, DECEMBER 2, 1939

The Platform of the American Medical Association

The American Medical Association advocates:

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.

2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.

3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.

4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.

5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.

6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.

7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.

8. Expansion of public health and medical services consistent with the American system of democracy.

HEREDITY IN INFECTIOUS DISEASES

Since 1923 the role of heredity in infectious diseases has been studied by Webster,[1] who investigated the behavior of these diseases in mice. Common practice shows, he says, that if a batch of mice is given an injection of a virulent agent by some artificial route the great majority die within a few hours. Observed differences in survival rates under the influence of less virulent agents, smaller doses and like variations have heretofore been attributed solely to uncontrolled errors of technic. It was shown in 1923 that batches of laboratory bred mice exposed to infectious agents in a way simulating nature differed from batches of uncontrolled mice in responding as a group in a relatively predictable manner. Further, by varying the diet a definite individual difference was demonstrable. Progeny from parents which died early from test infection with mouse typhoid were more susceptible than those from parents which survived such test infection. This observation was regarded as proof that parents which died early were actually more susceptible by inheritance than those which survived. From highly susceptible parents, lines of varying high susceptibility to mouse typhoid and to encephalitis virus were developed through selection and brother-to-sister inbreeding. Susceptibility remained unchanged for twelve generations in lines in which it was greatest at the outset, while, in lines in which it was intermediate, susceptibility increased through selection.

The same circumstances held true for resistant lines. The crossing of highly susceptible with highly resistant lines resulted in percentage mortalities approximately like those which would be expected on the basis of a single factor type of mendelian inheritance for resistance to mouse typhoid and to encephalitis virus as well. Resistance proved dominant in each instance. It was shown, however, that the amount of inherent resistance displayed by an individual to one infectious agent could not necessarily be taken as a measure of resistance to another infectious agent. Under conditions in which mouse typhoid is allowed to spread naturally among herds of mice composed of different proportions of individuals of innately high or low susceptibility, from 85 to 95 per cent of the innately susceptible succumbed to the infection, in contrast to less than 5 per cent of the innately resistant. The surviving population becomes composed, therefore, largely of individuals known at the outset to be innately resistant, although these are nevertheless likely to become infected and to harbor mouse typhoid bacilli. When new individuals, chiefly of innately resistant stocks, are added to surviving populations, mouse typhoid spreads to both resistant and susceptible. Mortality from the infection, however, is again almost exclusively limited to susceptible recruits and is sporadic or epidemic according to the numbers and proportions added.

1. Webster, Leslie T.: Heredity in Infectious Disease, J. Heredity 30:363 (Sept.) 1939.

Assuming the fact that inherited factors are of basic importance in determining the character of infection in both the individual and the herd, present interest is principally focused, Webster says, on the methods of modifying the expression of these factors through environmental ones. Of those tested so far, diet is the most important and has been proved capable of changing susceptibles to resistants and vice versa. Indeed, epidemics may be started and terminated merely by altering the dietary factors.

Even if only a few of the implications of these experimental studies can be applied to human conditions, the effect on medical thought may be revolutionary. The part which inherited disposition in resistance to infectious disease may play is highly important. A significant element may also be introduced into the understanding of many phases of human epidemiology. Finally the alteration of what appears to be a hereditary character by such environmental factors as diet may exert an unprophesiable effect on the course of many human activities. Indeed, even though the results of these studies cannot as yet be applied to man, they should serve to stimulate new lines of thought.

TRANSFUSION OF PRESERVED BLOOD

The obvious advantages of storing blood for transfusion have led to the adoption of "blood banks" by many large hospitals throughout the country.[1] With grouped and serologically tested blood always available, precious time is saved in the emergencies that so often arise in accident and surgical cases. In time of war this becomes even more important than in civil life. In addition there is a large financial saving, since there is less need for professional donors. During the past two years preserved blood has probably been used for thousands of transfusions.

While the transfusion of preserved blood has definite advantages, there are also certain limitations to its use. Blood is a living fluid, and processes tending toward autolysis continue even when it is stored at low temperatures in vitro. It becomes important to establish, therefore, the maximum length of time during which such blood can be kept before use, and in this there seems to be no unanimous agreement. Two methods of approach have been used, namely the study of the changes which occur in stored blood and the results of the transfusion of such blood.

Blood stored in vitro keeps best at temperatures between 0 and 5 C. But even at low temperatures the platelets and leukocytes break down within a period of only a few days. According to Rhoads and Panzer [2] the prothrombin time of blood stored even for periods of from one to two days is greatly prolonged, and therefore the censensus is that stored blood is not as useful as fresh blood in hemorrhagic diseases. Most of the studies have centered about the behavior of the erythrocytes, since these after all are the most essential elements in the treatment of hemorrhage and anemia. A progressive increase in the fragility of the erythrocytes has been noted as the storage time is lengthened, but manifest hemolysis is not evident until the end of the second week. Scudder and his co-workers [3] have observed a marked shift of the potassium ions from the red blood cells into the plasma with blood kept more than five days and feel therefore that such blood should not be used for transfusion. It seems doubtful, however, that the amount of free potassium is sufficient to cause toxic symptoms.

With regard to results of transfusion, it has been found that there is no difference in the incidence of untoward reactions provided the blood has not been kept too long. At the Cook County Hospital [1] the time limit set for the storage of blood is ten days, since a significant increase in the number and severity of reactions was noted when the blood had been kept for longer periods. From another angle, Schaefer and Wiener [4] have recently attacked the problem by tracing the fate of the transfused erythrocytes in the patient's circulation. With a method similar to that used by Ashby, who showed that when fresh blood is transfused the erythrocytes persist in the circulation for periods up to three or four months, these authors found that, when blood less than five to eight days old was transfused, the period of survival was not significantly different from that of fresh blood. However, in four cases when blood stored for periods ranging from ten to twenty days was used, the cells could be detected in the patient's circulation only up to from one to three weeks. In most of these cases the number of transfused erythrocytes dropped rapidly, and this was accompanied by the appearance of an icteric tint in the patient's serum. This could be demonstrated regularly after the injection of blood more than from eight to twelve days old, provided the patient's serum was examined at the proper time.

These investigations indicate that blood more than from a week to ten days old is not equivalent to fresh blood. Indeed, with blood that is too old there is even some danger of hemoglobinuria and serious symptoms such as are known to result from the transfusion of incompatible blood.

When the available data are taken into consideration, it is evident that the transfusion of preserved blood has acquired an important role. This is a great change in attitude from the opinion held less than two decades ago, when the transfusion of citrated blood even when fresh was looked at askance. However, there are defi-

1. Fantus, Bernard: The Therapy of the Cook County Hospital: Blood Preservation Technic, J. A. M. A. 111:317 (July 21) 1938.
2. Rhoads, J. E., and Panzer, L. M.: Prothrombin Time in "Bank Blood," J. A. M. A. 112:309 (Jan. 8) 1939.
3. Scudder, John; Drew, C. R.; Corcoran, Dorothy R., and Bull, D. C.: Studies in Blood Preservation: I. Repartition of Potassium in Cells and Plasma, J. A. M. A. 112:2263 (June 3) 1939.
4. Schaefer, George, and Wiener, A. S.: Limitations in the Use of Preserved Blood for Transfusions, Quart. Bull. Sea View Hosp. 8:17 (Oct.) 1939.

nite limitations to the use of stored blood which should be taken into account. Pending further investigation, a safe limit to set for the use of such blood would be between five and ten days. Perhaps by improving the method of storing blood it may be possible to extend the time limit.

Current Comment

NATIONAL PHYSICIANS' COMMITTEE FOR THE EXTENSION OF MEDICAL SERVICE

An item appears in the Organization Section in this issue of THE JOURNAL telling of the organization of the National Physicians' Committee for the Extension of Medical Service. This committee is headed by a group of physicians, many of whom are widely known for their work in the American Medical Association. The organization is not, however, officially connected with the American Medical Association itself. Information elicited from the officials of the National Physicians' Committee indicates that this group has been organized voluntarily to carry on education of the public regarding the extension of medical service and preventive medicine. Their work is of the nature of public relations activities. The National Physicians' Committee is in a position to accept contributions from industrial and other organizations in order to aid this campaign. The American Medical Association itself has not in the past and does not now accept such contributions. Officials of the organization state also that it is their intent to include in the various subcommittees of the main organization groups of dentists, nurses, hospital executives, pharmacists and all of the other special groups in the field of medicine.

NORMAL BLOOD PRESSURE

Much difference of opinion prevails as to what constitutes normal blood pressure; obviously the pressure can vary widely among different individuals of the same age groups or in the same individual at different ages and under altered circumstances. A recent study of this subject by Robinson and Brucer [1] has tended to revise downward generally accepted normal blood pressure levels. These authors made an exhaustive statistical study of 7,478 men and 3,405 women, all relatively sedentary in their occupations, selected at random in the Chicago area and economically selected by being able to afford insurance policies of $1,000 or more. Eighty-six per cent of the men had systolic blood pressures of between 90 and 130 mm. of mercury, 54 per cent between 100 and 120, 6 per cent below 100 and 25 per cent below 110. Of the women, 89 per cent had systolic pressures of between 90 and 130, 56 per cent between 100 and 120, 18 per cent below 100 and 44 per cent below 110. The greater tendency to low blood pressures in the women was found in the younger age groups. Up to the age of 60, half or more of the men had systolic pressures lower than 120, and that of about three fourths never rose above 130. The indications are, they say, that hypertensive men are those who have systolic pressures above 120 appearing at an early age. The authors also presented the continuous blood pressure history of 500 apparently well men examined annually over a period of about ten years. Blood pressures consistently low did not show as much change from year to year as those consistently high. Persons with systolic pressures below 120 rarely changed their level in the direction of a steady rise. In the third phase of this study Robinson and Brucer pointed out that deviations from physiologic norms represent the most accurate check on degenerative processes at work and of potential longevity. If the upper limits of normal pressures are set at 120 systolic and 80 diastolic, a definite parallelism could be observed with the actuarial figures of insurance companies. With a rise in blood pressure there was an abrupt rise in death rate. Pressures, they conclude, of 130 to 144 systolic and diastolic pressures of over 80 cannot be regarded as normal. Accordingly, the popular notion that low blood pressure is a disease and moderately high pressure normal and safe is fallacious. On the contrary, they say, longevity is based on three physiologic levels: low weight, low pulse rate and low blood pressure.

1. Robinson, Samuel C., and Brucer, Marshall: Range of Normal Blood Pressure, Arch. Int. Med. 64:409 (Sept.) 1939.

THE MEDICAL SOCIETY OF DELAWARE

One hundred and fifty years ago, twelve days after George Washington took the oath of office as first President of the United States, a group of twenty-seven physicians brought into being the Medical Society of Delaware, the third oldest state medical society and the second oldest medical corporation in the United States. At a recent banquet in celebration of this occasion the speakers were Hon. Richard C. McMullen, governor of Delaware, Dr. Rock Sleyster, of Wauwatosa, Wis., President of the American Medical Association, Dr. L. A. H. Bishop, past president of the Medical Society of Delaware, and Mrs. Rollo K. Packard, of Chicago, National President of the Woman's Auxiliary to the American Medical Association. The Delaware Academy of Medicine exhibited books, instruments, photographs and other articles belonging to the early members of the Medical Society of Delaware. Furthermore, the president of the society, Dr. M. I. Samuel, prepared a special book in connection with the sesquicentennial celebration in which are brief accounts of meetings of the society from year to year, notations on papers read before the fellows, a list of the members of the many committees of the society, a historical account of the early organization, excerpts from presidential addresses, biographies and portraits of the society's presidents, short descriptions of the hospitals in the state of Delaware, and records of the health laws and medical practice acts. The cooperation of the Medical Society of Delaware with the state legislature has brought about laws which safeguard the health of that community and insure to the people high standards of medical care.

ORGANIZATION SECTION

THE NATIONAL PHYSICIANS' COMMITTEE FOR THE EXTENSION OF MEDICAL SERVICE

On November 18, in Chicago, a formal meeting of an executive board officially launched a new organization, the National Physicians' Committee for the Extension of Medical Service. At this meeting the following officers were elected: Dr. Edward H. Cary, Dallas, Texas, chairman; Dr. Austin A. Hayden, Chicago, secretary, and Dr. N. S. Davis III, Chicago, treasurer. These officers were given authority to act as a management committee for the new organization.

A central committee of more than 800 physicians is being formed, in which all the states will be represented. Some of those already listed in the central committee include Drs. Howard Morrow, San Francisco; Charles W. Mayo, Rochester, Minn.; Herman L. Kretschmer, Chicago, and Charles Gordon Heyd and Haven Emerson, New York.

The organization is an independent one, not affiliated in any way whatever with the committee sponsored by Mr. Frank Gannett under the management of Dr. Edward A. Rumely or with the so-called Committee of Physicians or with the American Medical Association. The functions will not, it is stated, overlap or infringe on those of existing county, state or national medical organizations. For its finances, this organization depends wholly on voluntary contributions from physicians, dentists, nurses, hospitals, pharmacists and lay groups interested in the maintenance of the private practice of medicine. In literature released by the Management Committee, the reasons for forming this new institution are stated as follows:

> Medicine is confronted with two new sets of conditions. On the one hand, widespread unemployment, low farm income, and the continuation of conditions of general depression have made it difficult for an ever increasing number of people to pay for the best medical service and proper hospitalization out of earnings.
>
> On the other hand, there is the trend—worldwide in scope—toward governmental paternalism and the false, suicidal doctrine that the "state" can provide a service and a security that the people cannot otherwise obtain. As related to medicine, the implementing of this concept would effect revolutionary changes in both the practice of medicine and the underlying philosophy which has given it the dynamic quality that resulted in world-wide leadership.
>
> If the ethical and scientific standards are to be maintained, the independence of American medicine preserved and the public interest best served, American physicians must:
>
> 1. Make possible the providing of medical service to the indigent and those in the low income groups, and insure the most widespread distribution of the most effective methods and equipment in medicine and surgery.
>
> 2. Assume the responsibility of countering destructive propaganda by familiarizing the public with the facts in connection with the methods and the achievements of American medicine.

The objectives are embodied in a motion, unanimously adopted by the directors:

> *Resolved*, That the National Physicians' Committee for the Extension of Medical Service is a nonprofit, nonpolitical organization for maintaining ethical and scientific standards and extending medical service to all the people . . . and for . . . cooperating with lay and medical institutions and groups, interested in the preservation of national health, to make more generally known the achievements and to safeguard the independence of American medicine.

A broadgage nationwide educational program has been planned and the preliminary steps have been taken to put it in operation. An effort will be made to familiarize the public with the aims, the methods and the effectiveness of American medicine. It is believed that this will result in generally improving health conditions and will tend to offset propaganda that is altering the point of view of the individual and adversely affecting the status of the physician.

The Executive Board includes Dr. Edward H. Cary, Dallas, Texas; Dr. Austin Hayden, Chicago; Dr. N. S. Davis III, Chicago; Dr. Irvin Abell, Louisville, Ky.; Dr. F. F. Borzell, Philadelphia; Dr. William F. Braasch, Rochester, Minn.; Dr. John A. Hartwell, New York; Dr. Roger I. Lee, Boston; Dr. Alphonse McMahon, St. Louis; Dr. E. H. Skinner, Kansas City, Mo., and Dr. Charles B. Wright, Minneapolis.

Mr. John M. Pratt has been secured as executive administrator. The offices are at 700 North Michigan Avenue, Chicago.

THE A. M. A. PROGRAM

[Editorial from the Providence Sunday Journal, Nov. 19, 1939]

The American Medical Association has come out with a program of principles for solving the nation's health problems without resorting to federal government control and compulsory sickness insurance. Its own program is set up as a backfire to the other, against which one of the chief arguments the Association advances is that it would comprise a trend away from democracy.

Everybody talks about democracy and the menaces to it these days. Regimentation of life in certain foreign countries induces a wholesome, overdue reexamination of the values of individual freedom and corollary responsibility under democracy's looser system. It is seen and keenly appreciated again, as if it were a new discovery, that the free and responsible individual who is the unit of government is a far different person than the man or woman who is the creature of government.

But it is not so clearly seen that regimentation can come to a people insidiously, in beneficent guise, as well as through the compulsion of a recognized and feared dictatorship; that, for example, the eager pursuit of social objectives which are intrinsically admirable may require dangerous strengthening and extension of the federal power, debilitation of the states as sovereign entities which are closer to the people and further destruction of individual responsibility, self reliance and freedom of action.

To the extent that that occurs democracy is damaged, and it is for that reason that it is decidedly in point to study proposed approaches to the national health problem with the preservation of democracy in mind.

The federal government, from motives of paternalism or bureaucracy, has a well developed penchant for patting the

citizen on the head—extracting money from his pocket, of course, to pay for the gesture. There are some who would now have it wipe his nose and extract some more money, this paternalism being in the form of compulsory sickness insurance. It would further decrease his economic freedom of action, but no thought is given to that. It would further decrease his responsibility and capacity for taking care of himself on his own initiative, and it would alter, perhaps profoundly, his traditional and important relationship to the medical profession, which exists for and because of his needs as a private citizen and human creature rather than as a ward of government. But no thought is given to that, either.

The fact is that the advocates of head patting and nose wiping want, or at least are willing to accept, a socialized nation as the price of paternalism. The battle with them therefore ought to be waged on that front. Health is not the issue; democracy is. As a matter of fact the prime public problem in the United States today is not at all the health of the citizens; the prime problem is the decidedly poor health that the federal government is enjoying. The latter is obese with bureaucracy and ravenously hungry for more taxes to satisfy its self-generated, insatiable appetite. It ought to be put on a programmatic diet before it eats us out of house and home. Is there a doctor in the house?

OFFICIAL NOTES

ANNUAL CONGRESS ON INDUSTRIAL HEALTH

Arrangements have been completed for the second Annual Congress on Industrial Health sponsored by the American Medical Association, which will be held Monday and Tuesday, Jan. 15 and 16, 1940, at the Palmer House in Chicago.

Topics and speakers are as follows:

Opening Session, Monday Morning, 9:45

Report of the Council on Industrial Health.
Stanley J. Sarger, M.D., Chairman, Milwaukee.

Vocational Rehabilitation in Relation to Medical Practice and Workmen's Compensation Procedure.
Terry C. Foster, U. S. Office of Education, Washington, D. C.

Industrial Psychiatry and Mental Hygiene.
Lydia G. Giberson, M.D., New York.

Adequate Nutrition for the Industrial Worker.
Lela E. Booher, Ph.D., U. S. Department of Agriculture, Washington, D. C.

Monday Afternoon, 2:15

SYPHILIS IN INDUSTRY

Syphilis in Industry with Special Reference to Its Incidence and Relation to Trauma.
Earl D. Osborne, M.D., Professor of Dermatology and Syphilology, University of Buffalo School of Medicine, Buffalo.

Syphilis Case Finding in Industry.
Albert E. Russell, M.D., Surgeon in Charge, Office of Syphilis Control in Industry, U. S. Public Health Service, Chicago.

Integrating Syphilis Control Between the Industrial and the Private Practitioner.
Harold A. Vonachen, M.D., President, Central States Society of Industrial Medicine and Surgery, Peoria, Ill.

Syphilis and Employment.
Harvey Bartle, M.D., Chief Medical Examiner, Pennsylvania Railroad, Philadelphia.

Monday Evening, 6:30

An informal dinner and round table discussion, intended primarily for members of state and county medical society committees on industrial health, will be held. The subject matter for discussion will include problems of organization and plans for future activity.

Tuesday Morning, 9:30

PHYSICAL EXAMINATIONS

Objectives of Health Examinations and Their Industrial Applications.
McIver Woody, M.D., President, American Association of Industrial Physicians and Surgeons, New York.

The Private Practitioner and Industrial Physical Examinations.
Raymond Hussey, M.D., Chairman of Committee on Industrial Health, Medical and Chirurgical Faculty of the State of Maryland, Baltimore.

The Wisconsin Plan for Physical Examinations in Industry: The Point of View of the Industrial Commission.
Harry A. Nelson, Director, Workmen's Compensation, Industrial Commission of Wisconsin, Madison, Wis.

Scope and Methods of Industrial Physical Examinations of the Wisconsin Plan.
Paul A. Behm, M.D., Chairman of the Medical Subcommittee on Physical Examinations in Industry, Industrial Commission of Wisconsin, Madison, Wis.

Tuesday Afternoon, 2 O'Clock

DISABILITY EVALUATION

Hearing Loss—Estimation of Disability.
Austin Hayden, M.D., Chairman Consultants on Audiometers and Hearing Aids, Council on Physical Therapy, American Medical Association, Chicago.

Present Status of Estimating Disability from Visual Loss.
Harry S. Gradle, M.D., Chicago.

Are Uniform Standards of Disability Evaluation Practicable?
Earl D. McBride, M.D., Oklahoma City.

Critique of Disability Evaluation.
Henry H. Kessler, M.D., Newark, N. J.

Wednesday, January 17

On the day following the Congress on Industrial Health, the Chicago Medical Society will conduct all day clinics illustrating practical problems in industrial medicine and traumatic surgery at St. Luke's Hospital in Chicago. These programs are under the direction of Drs. James A. Britton and Harry E. Mock respectively.

On the same day the Chicago Medical Society will conduct a dinner and evening meeting to be addressed by Dr. Vilray P. Blair, St. Louis, on "Treatment of Facial Deformities Caused by Injury."

Further details regarding these presentations will be available to registrants at the congress, all of whom are invited to participate in the programs.

ABSTRACT OF MINUTES OF MEETINGS OF BOARD OF TRUSTEES

The regular fall meeting of the Board was held during the day and evening of November 16 and on November 17.

Meetings of Board of Trustees with Representatives of Other Organizations

A joint meeting of the Board of Regents of the American College of Surgeons and the Board of Trustees of the American Medical Association was held, at which numerous subjects of mutual interest were discussed, some of which were referred for further study to a committee to be appointed by the two organizations.

Arrangements were made for a meeting of representatives of the American, Catholic and Protestant hospital associations with the Executive Committee of the Board of Trustees in December and for a meeting of representatives of the American Society of Clinical Pathologists with the Executive Committee in January.

Report of Committee on American Health Resorts

A report from the Committee on American Health Resorts recommending that information on health resorts in the United States be assembled was presented and adopted.

Representation on Committee of American Film Center, Inc., and on Advisory Board of American Camping Association, Inc.

Dr. W. W. Bauer was authorized to accept membership on the Committee on Public Health Films of the American Film Center, Inc., and on the Advisory Board of the American Camping Association, Inc.

Platform for Health and Medical Care

A platform for the American Medical Association was established indicative of the trend which the Association believes should be followed in the development of health activities and medical care for the people of the United States, and authorization was given for its publication in The Journal.

NATIONAL PHYSICIANS' COMMITTEE FOR THE EXTENSION OF MEDICAL SERVICE

Authorization was given for the publication in THE JOURNAL of a brief statement relative to the organization and purposes of a committee known as the National Physicians' Committee for the Extension of Medical Service; also for the publication of a communication relative to the Committee of Physicians.

CONFERENCE ON NOMENCLATURE

The Board authorized the calling of a conference early in 1940 for the revision of the Standard Classified Nomenclature of Disease.

OMISSION OF "COL." AFTER THE NAMES OF NEGRO PHYSICIANS IN AMERICAN MEDICAL DIRECTORY

Instructions were given for the omission of the designation "col." after the names of Negro physicians in the next edition of the American Medical Directory.

VOTE OF THANKS FOR SPACE FOR EXHIBIT OF HYGEIA AT NEW YORK WORLD'S FAIR

A vote of thanks was extended to Dr. Martin A. Couney for the prominent space made available to the Association for an exhibit of *Hygeia* in the Incubator Building at the New York World's Fair, which was visited by 275,000 persons in 1939.

Other business before the Board was concerned with the general affairs of the Association.

ADDRESSES BY OFFICIAL STAFF

DR. W. W. BAUER:

December 4—Cole County Medical Society Auxiliary, Jefferson City, Mo.
December 5—Stephens College, Convocation, Columbus, Mo.
December 5—Boone County Medical Society, Columbus, Mo.
December 7—Greene County Medical Society, Woman's Auxiliary, Springfield, Mo.
December 12—Emmett Parent Teacher Association, Chicago.
December 12—Junior Chamber of Commerce, Clinton, Iowa.

DR. MORRIS FISHBEIN:

December 6—Chamber of Commerce, Duluth, Minn.
December 6—Industrial Safety Conference, Duluth, Minn.
December 11—Mothers' Aid, Chicago.
December 13—Forum and Medical Society, Frankfort, Ky.
December 14—Louisville District Dental Society and Jefferson County Medical Association, Louisville, Ky.

DR. R. G. LELAND:

December 1—Phi Beta Pi Fraternity, Rush Medical College, Chicago.
December 7-10—American Public Welfare Association, Round Table Conference on Medical Care, Washington, D. C.
December 13—Des Moines Public Forum, Des Moines, Iowa.

DR. ROCK SLEYSTER:

December 5—Medical Society of South Carolina, Charleston, S. C.

DR. PAUL A. TESCHNER:

December 4—National Committee on Boys and Girls Club Work, 4 H Movement, Meeting, Chicago.
December 6—High School, Peru, Ind.
December 6—Junior High School, Peru, Ind.
December 6—Parent Teacher Association, Peru, Ind.
December 8—Milwaukee County Medical Society Auxiliary, Milwaukee.
December 13—Kane County Medical Society, Elgin, Ill.

DR. NATHAN B. VAN ETTEN:

December 5—South Carolina Medical Association, Charleston.
December 19—The New York County Medical Society, New York.

RADIO BROADCASTS

The seventh season of broadcasting by the American Medical Association over the facilities of the National Broadcasting Company and affiliated stations is now underway with programs scheduled each Thursday at 4:30 p. m. eastern standard time (3:30 central standard time, 2:30 mountain time and 1:30 Pacific time). The program is on the Blue network of the National Broadcasting Company, whose key station is WJZ, New York.

The title of the program is Medicine in the News. It is a fast moving, varied, dramatized program based each week on an important news item from THE JOURNAL, a state medical journal or other reputable medical publication, or *Hygeia*. Each program will also include the week's medical highlight, which will be either an interesting, amusing or unusual incident, or a series of brief news items taken from current medical literature.

Each week's program will include a question received from a lay inquirer by the American Medical Association. These questions will be of timely, seasonal interest or of universal appeal. The question will be asked at the opening of the program and answered at the close of the program.

It is not possible to state definitely exactly the stations which are taking the program. A list of stations on the Blue network was published in THE JOURNAL, October 28. Inquiries should be made of the local station by a committee of the county medical society or the auxiliary. The advantages of the program and its interest to the public should be called to the attention of the station management by the local medical society or auxiliary.

The following radio stations have signified their intention of broadcasting Medicine in the News, according to information received from the National Broadcasting Company, November 24:

New England States

WNBC	New Britain, Conn.
WLBZ	Bangor, Me.
WEAN	Providence, R. I.

Middle Atlantic States

WABY	Albany, N. Y.
WBEN	Buffalo
WJTN	Jamestown, N. Y.
WJZ	New York
WMFF	Plattsburg, N. Y.
WSAN	Allentown, Pa.
WLEU	Erie, Pa.
WKBO	Harrisburg, Pa.
WGAL	Lancaster, Pa.
WFIL	Philadelphia
KDKA	Pittsburgh
WORK	York, Pa.

East North Central States

WENR	Chicago
WGL	Fort Wayne, Ind.
WBOW	Terre Haute, Ind.
WBCM	Bay City, Mich.
WXYZ	Detroit
WFDF	Flint, Mich.
WIBM	Jackson, Mich.
WJIM	Lansing, Mich.
WSAI	Cincinnati
WING	Dayton, Ohio
WIBA	Madison, Wis.

West North Central States

KSO	Des Moines, Iowa
KMA	Shenandoah, Iowa
KSCJ	Sioux City, Iowa
WREN	Lawrence, Kan.
KANS	Wichita, Kan.
KYSM	Mankato, Minn.
WTCN	Minneapolis
KROC	Rochester, Minn.
KFAM	St. Cloud, Minn.
KWK	St. Louis
KSOO	Sioux Falls, S. D.

South Atlantic States

WCOA	Pensacola, Fla.
WAGA	Atlanta, Ga.
WSOC	Charlotte, N. C.
WTAR	Norfolk, Va.
WRTD	Richmond, Va.
WCHS	Charleston, W. Va.
WBLK	Clarksburg, W. Va.

East South Central States

WAVE	Louisville, Ky.
WAPO	Chattanooga, Tenn.
WROL	Knoxville, Tenn.

West South Central States

WJBO	Baton Rouge, La.
KTOK	Oklahoma City
KFDM	Beaumont, Texas
KTSM	El Paso, Texas
KGKO	Fort Worth, Texas
KXYZ	Houston, Texas
KRGV	Weslaco, Texas

Mountain States

KTAR	Phoenix, Ariz.
KVOA	Tucson, Ariz.
KVOD	Denver
KGHF	Pueblo, Colo.
KOB	Albuquerque, N. M.
KLO	Ogden, Utah
KUTA	Salt Lake City

Pacific States

KECA	Los Angeles
KFSD	San Diego, Calif.
KGO	San Francisco
KTMS	Santa Barbara, Calif.
KEX	Portland, Ore.
KJR	Seattle
KGA	Spokane

Canada

CFCF	Montreal

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WOMAN'S AUXILIARY

Illinois

The auxiliary to the Bureau County Medical Society met at Spring Valley September 12 at the home of Mrs. M. A. Nix. A donation of $50 was made to the Crippled Children's Clinic.

The auxiliary to the Coles-Cumberland Counties Medical Society met at Mattoon September 20. Mrs. W. R. Rhodes of Toledo addressed the group on the national and state public health service.

The auxiliary to the Sangamon County Medical Society held an Acquaintance Day Luncheon September 11. The first regular program was held September 25 at the home of one of the members. A review of the September issue of *Hygeia* was given.

New York

The auxiliary to the Nassau County Medical Society met in the Nassau Hospital Auditorium September 20. The auxiliary is cooperating with the County Cancer Committee. At the auxiliary meeting held on September 26 Miss Muriel Bliss, chairman of the Nassau County Committee on Cancer, was guest speaker.

The first meeting of the auxiliary to the Medical Society of Saratoga County was held October 3 in Schuylerville. Addresses were given by physicians on the subjects colds and pneumonia and the importance of hospitals to communities. Auxiliaries to the medical societies of Sullivan County and of Washington County have recently been organized.

Texas

An executive board meeting of the auxiliary to the State Medical Association of Texas was held in Dallas September 21. Mrs. S. H. Watson, Waxahachie, president, reports that forty-one members attended the meeting. —— Taylor-Jones Counties Auxiliary will provide one month's maintenance for a needy student at the Texas State College for Women, Denton. ——The Central Texas District Auxiliary met in Cleburne recently. Mrs. F. F. Kirby, past president of the state auxiliary, and Mrs. L. B. Leake, treasurer, gave addresses. The auxiliary was entertained at a joint luncheon with its district medical society at the First Methodist Church. On this occasion Dr. L. H. Reeves, president of the state medical association, was the speaker.

Utah

The board of directors of the auxiliary to the Utah State Medical Association met in Provo October 12. A history of the pioneer physicians of Utah will be prepared by the auxiliary under the direction of Mrs. Walter M. Stookey, past president. The auxiliary will send delegates to the Legislative Council, which meets once each month at the State Capitol in Salt Lake City.

The auxiliary to the Carbon County Medical Society met at the Carbon Country Club October 7. Mrs. Bliss Finlayson of Price will arrange radio programs for the auxiliary.

The auxiliary to the Utah County Medical Society held its first autumn meeting at the home of Mrs. Arnold Robinson in Provo. Plans were made to place *Hygeia* in every grade and high school in the county.

Washington

The auxiliary to the Clark County Medical Society met at the home of Mrs. Charles Otto on the Evergreen Highway overlooking the Columbia River October 3. Plans are being made for the placing of *Hygeia* in reading rooms of public schools.

The auxiliary to the Grays Harbor Medical Society held its September meeting in Aberdeen. Copies of the pamphlet "On the Witness Stand" were distributed.

The September meeting of the auxiliary to the King County Medical Society was held at the Woman's University Club, Seattle. A membership tea was given at the home of Mrs. L. L. Stephens in October, at which time many new members were welcomed. Members of the county Hygeia committee have visited outlying communities near Seattle, securing subscriptions for *Hygeia*.

MEDICAL ECONOMIC ABSTRACTS

GROUP HOSPITALIZATION IN WAYNE COUNTY

The Wayne County Medical Society has recommended to its council that the plan offered by the Michigan society for group hospitalization be made available to members of the county medical society.

The Michigan Society for Group Hospitalization was organized by the hospitals of Michigan. It is a nonprofit organization; the members of the board of trustees receive no reimbursement for their services; all employees of the society are on a straight salary basis, and no fees or commissions are paid to representatives. The seventy-eight participating hospitals guarantee the services provided for in the subscriber's certificate—no assessment is possible. The subscriber is assured of hospital service at cost, as the certificate provides that any surplus accruing in the operation of the plan will be returned to the subscribers in the form either of reduced rates or of increased benefits. Ordinarily the plan is available only to groups of ten or more employed people through their place of employment, but special arrangements have been made to make the service available to members of the medical society.

There are no age limits for adults, no physical examination required and no exemptions for chronic conditions. In case of an emergency a subscriber may go to any hospital in the world, and if he holds a ward certificate he will receive $4.50 a day toward his hospital bill or $6 a day if he holds a semiprivate certificate. The seventy-eight hospitals that guarantee the service are located in forty-one Michigan cities. During the five months that the plan has been in operation 45,000 subscribers have been enrolled.

The county medical society members are now being circularized with an application blank which is also intended as a referendum to determine whether the members approve the plan and if so are willing to enroll.

THE ORDER OF PHYSICIANS IN PORTUGAL

A little more than a year ago the Belgian medical profession was made a legal organization in which every licensed physician is required to hold a membership. Similar legislation was enacted in Germany and Italy, shortly after these became totalitarian states. Portugal has now enacted a similar law, a copy of which appears in the *Presse médicale* for August 12, 1939, page 1239.

The provisions of the Portuguese law creating an "integrated" profession make legal some of the provisions of medical ethics. This is true also in the legislation of the other countries. For example, the physician is required "to respect the customs and local traditions with relation to his patients, and to act with loyalty with regard to his colleagues, and to conduct conscientiously his professional and social duties." All species of advertising, including interviews with the press which tend to attract a clientele, are absolutely forbidden. Pharmacists, chemical laboratories, drug stores or any establishments for the sale of pharmaceutic products and all similar institutions are strictly forbidden to give any sort of medical consultations or prescriptions.

The form of organization, including the management of the order by regular conventions and the form of administration to be set up, are prescribed in the law.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Regional Meeting.—The Northwestern Division of the Alabama State Medical Association will meet in Parrish December 7. At this meeting plaques will be awarded by the Walker County Medical Society to Dr. Charles B. Jackson, Jasper, posthumously, for fifty-three years of distinguished service to the medical profession and to Dr. Hugh W. Stephenson, Oakman, commemorating sixty years of active practice. The speakers will include Drs. Glenn I. Jones, Washington, D. C., on "Railroad Medical Service"; James A. Meadows and Karl F. Kesmodel, Birmingham, "Diagnosis of Cancerous Lesions"; Thompson F. Wickliffe, Jasper, "Virus Diseases"; Sam P. Wainwright, Birmingham, "The Thymus Gland," and Gilbert B. Greene, Birmingham, "Surgical Management of Thyrotoxicosis."

CALIFORNIA

Course for Practitioners.—The University of California Medical School, San Francisco, will offer a course for general practitioners at the University of California Hospital, San Francisco, Jan. 3-6, 1940. The course has been designed to meet the needs of the physician in private practice. Patients, lantern slides and pathologic material will be used to illustrate the discussions.

Society News.—At the annual meeting of the Los Angeles County Medical Association, December 7, Dr. George Franklin Farman will discuss the "History of the Urologic Section and Its Relationship to the Los Angeles County Medical Association," and Dr. Herman L. Kretschmer, Chicago, "The Present Status of Transurethral Resection."——The Los Angeles Society of Neurology and Psychiatry was addressed November 15 by Drs. Clarence W. Olsen on "Injury to the Spinal Cord Incident to Hypodermic Injection," and Samuel D. Ingham, "Neurologic Interpretations of Convulsive Symptoms."——At a meeting of the Los Angeles Society of Ophthalmology and Otolaryngology November 27 the speakers were Drs. Leland R. House on "Cysts in the Maxillary Sinus" and Cyril B. Courville, "Prodromal Syndrome of the Intracranial Extension of Middle Ear and Mastoid Infection."

COLORADO

Society News.—Dr. Robert K. Dixon, Denver, discussed gastro-enterology before the Northeast Colorado Medical Society in Sterling October 12.——At a meeting of the Delta County Medical Society in Delta October 27 Dr. Lawrence L. Hick discussed "Recent Advances in the Treatment of Pneumonia."——The Larimer County Medical Society was addressed in Fort Collins November 1 by Dr. Foster L. Matchett on "Orthopedic Approach to Low Back Pain" and "Internal Fixation of Broken Hips."——The Washington-Yuma Counties Medical Society met in Yuma October 20; the speakers were Drs. Lyman W. Mason on "Pelvic Infections" and Ward Darley Jr. on "Advancement in Diagnosis and Treatment of Cardiac Diseases."——Dr. Henry A. Buchtel, Denver, discussed "Urology and Treatment of Urologic Diseases" at a meeting of the Weld County Medical Society in Greeley November 6.

CONNECTICUT

Society News.—Arne Tiselius, Ph.D., Institute of Physical Chemistry, University of Uppsala, Uppsala, Sweden, discussed "The Application of Electrophoresis Methods to Some Problems in Biochemistry and Medicine" before the Yale Medical Society October 25 under the auspices of the Jane Coffin Childs Memorial Fund for Medical Research.——Dr. Lee E. Farr, New York, discussed "Studies of Nitrogen Metabolism in Children with the Nephrotic Syndrome" before the Yale Medical Society November 8.

Discussions on Pneumonia.—The Connecticut State Medical Society and the state department of health announce a series of programs on the treatment of pneumonia to be given in cooperation with the following medical societies: Bridgeport, Central, Danbury, Greenwich, Hartford, Manchester, Meriden, New Britain, New London, New Haven, Norwalk, Norwich, Torrington and Waterbury. Dr. Louis H. Nahum, New Haven, opened the series November 16. Other speakers will include:

Dr. Chester S. Keefer, Boston, December 4, in New Britain.
Dr. Russell L. Cecil, New York, December 6, in Hartford.
Dr. Francis G. Blake, New Haven, December 7, in Norwich.
Dr. Blake, December 13, in Danbury.
Dr. John A. Wentworth, Hartford, December 14, in Waterbury.
Dr. Theodore S. Evans, New Haven, December 19, in Greenwich.
Dr. Thomas P. Murdock, Meriden, December 20, in Middletown.
Dr. Blake, December 20, in Norwalk.
Dr. Samuel J. Goldberg, New Haven, January 3, in Meriden.
Dr. Clarence L. Robbins, New Haven, January 3, in Litchfield.
Dr. Blake, January 26, in Manchester.
In Bridgeport March 5, speaker to be announced.

DISTRICT OF COLUMBIA

Society News.—Forest Ray Moulton, Ph.D., permanent secretary, American Association for the Advancement of Science, Washington, D. C., discussed "A Jaundiced Look at the Human Machine" before the Academy of Medicine of Washington October 27.——Dr. Louis H. Clerf, Philadelphia, discussed "Diagnostic Information Derivable from Bronchoscopy" before the naval medical and dental officers on duty in the district at a meeting in the naval medical school November 6.

New Professor of Psychiatry at Georgetown.—Dr. Harry Stack Sullivan, New York, president of the William Alanson White Psychiatric Foundation and faculty chairman of the Washington School of Psychiatry, has been appointed professor of psychiatry and director of the department of psychiatry and neurology at Georgetown University School of Medicine. He succeeds the late Dr. Daniel Percy Hickling, who was a member of the faculty of Georgetown for more than forty years. Dr. Sullivan graduated at the Chicago College of Medicine and Surgery in 1917. He served as associate professor of psychiatry at the University of Maryland School of Medicine from 1923 to 1930 and concurrently as director of clinical research at the Sheppard and Enoch Pratt Hospital, Baltimore.

ILLINOIS

Postgraduate Conference.—Physicians of the seventh, eighth and eleventh councilor districts in cooperation with the Illinois State Medical Society are cooperating in a postgraduate conference to be held in Champaign December 7. The subjects planned for discussion in this conference, which is the second of a new program planned by the state society, include:

The Fundamentals in the Use of Sulfanilamide and Its Allied Compounds in Infection, Dr. Oswald H. Robertson.
Recent Developments in the Treatment of Diabetes Mellitus, Dr. Robert W. Keeton.
Cardiac Emergencies and Their Treatment, Dr. Carlo S. Seuderi.
The Treatment of Athlete's Foot and Other Fungous Infections of the Skin, Dr. Francis E. Senear.
The Treatment of Common Ailments in Children, Dr. Robert A. Black.
Physical Therapy, Dr. John S. Coulter.
The Management of the Male and Female Climacteric, Dr. James H. Hutton.
The Treatment of Head Injuries, Dr. Harry Muck.
Why, When and How to Immunize, Dr. Harry Leichenger.
Treatment of Common Disorders of the Upper Respiratory Tract, Dr. Francis L. Lederer.

All the speakers are from Chicago.

Society News.—Dr. James H. Hutton, Chicago, addressed the Lawrence County Medical Society at Lawrenceville November 1 on "Classification and Management of the Nervous Hypotensive Patient."——At a meeting of the Sangamon County Medical Society in Springfield November 2 Dr. Vernon C. David, Chicago, spoke on "Carcinoma of the Sigmoid and Rectum."——Dr. Milton H. Kronenberg, Chicago, read a paper before the Winnebago County Medical Society at Rockford November 3 entitled "The General Practitioner's Approach to Industrial Hygiene."——Dr. Benjamin M. Levin, Chicago, discussed "Surgical Diseases of Childhood" before the Bureau County Medical Society in Princeton November 21.——Dr. Irving L. Turow, Peoria, was elected president of the Physicians' Association of the Illinois State Department of Public Welfare at its meeting in Peoria October 12; Dr. George L. Perkins, Manteno State Hospital, was chosen vice president and Dr. Jacob W. Klapman, Chicago State Hospital, was reelected secretary-treasurer.——Dr. Roland M. Klemme, St. Louis, discussed "Surgical Treatment of Parkinson's Disease" before the Champaign County Medical Society, November 9.

Chicago

Society News.—Among the speakers before the Chicago Laryngological and Otological Society December 4 were the following: Drs. J. Allan Weiss on "Mucocele of the Frontal

Sinus"; Robert Henner, "Endaural Complete Mastoidectomy and Attico-Mastoidectomy," and Frank J. Piszkiewicz, "Nasopharyngeal Tuberculosis"; all are members of the staff of the Illinois Eye and Ear Infirmary.——A symposium on the treatment of prostatism was presented before the Chicago Urological Society November 30 by Drs. Herman L. Kretschmer, Harry C. Rolnick and Gustav Kolischer.

University News.—Ralph H. Müller, Ph.D., New York, opened a series of six lecture-conferences and demonstrations at the University of Chicago November 6 on "Electronics in Chemistry and Technology."——The Tuberculosis Institute of Chicago and Cook County through the Theodore B. Sachs Memorial Fund has made $1,000 available to support a study on bronchiectasis and pulmonary abscesses at the University of Illinois College of Medicine. The work is being conducted by Drs. Felix Basch of the department of pediatrics and Paul H. Holinger of the department of otolaryngology.

INDIANA

University Aids City Dispensary.—The Indianapolis Board of Health has approved an arrangement whereby the Indiana University Medical Center, Indianapolis, will give the city hospital dispensary $10,000 annually to improve the service and the teaching facilities for the school of medicine. Two full time physicians have been named to the dispensary by the university, Drs. Joseph Edward Tether Jr. and August M. Hasewinkle, and two more will be added. With the increased full time staff it is hoped to make unnecessary the return visits by patients to the dispensary. The staff also will be able to treat the patients more rapidly by systematizing appointments. For its assistance, the medical school will be compensated by improved and increased teaching facilities in the dispensary for medical students.

Society News.—Dr. James A. Britton, Chicago, discussed "Medicine in Industry" before the Indianapolis Medical Society October 24. At a meeting October 31 the speakers were Drs. Ethelbert R. Wilson on "The Coroner's Role in Medicolegal Investigation"; John T. Day, "Causes of Chronic Gonorrheal Infection," and Verne K. Harvey, "The Epidemiology of Rocky Mountain Spotted Fever." —— At a meeting of the Fountain-Warren Counties Medical Society in Kingman in October Dr. James O. Ritchey, Indianapolis, discussed goiter. ——The Fort Wayne Medical Society was addressed October 3 by Drs. Lester L. Eberhart, Angola, on "Treatment of Hip Fracture by Internal Fixation"; Max M. Gitlin, Bluffton, "Undulant Fever," and Thomas O. Dorrance, Bluffton, "Scurvy in Infants." —— Drs. Matthew Winters, Indianapolis, and Charles F. Thompson, Indianapolis, discussed "Diarrheas in Infancy" and "Causes of Delayed Walking" before the Shelby County Medical Society in Shelbyville October 4.

KANSAS

Postgraduate Course.—A postgraduate course on syphilis and gonorrhea was started early in November under the auspices of the state board of health and the committee on control of venereal disease of the Kansas Medical Society. It is planned to devote three months to this program so that two lectures each on syphilis and gonorrhea will be presented at a central location in each of the twelve councilor districts. Dr. Arthur D. Gray, Topeka, is the lecturer.

LOUISIANA

Extension Program.—The Graduate School of Medicine of Louisiana State University, New Orleans, inaugurated its 1939-1940 extension program with a symposium on pneumonia before the Franklin Parish Medical Society at Winnsboro November 15. The speakers were Drs. John R. Schenken on "Pathology and Pathogenesis of Pneumonia"; Robert H. Bayley, "Diagnosis and Differential Diagnosis of Pneumonia," and Joseph O. Weilbaecher Jr., "Treatment of Pneumonia."

MARYLAND

Society News.—Dr. John M. McDonald, Baltimore, discussed "Occupational Health Hazards of the Industries in Maryland" before the Medical and Chirurgical Faculty of Maryland October 24.——At a meeting of the Baltimore City Medical Society October 20 Drs. John Sheldon Eastland spoke on "Use of Vitamin K in Obstructive Jaundice" and Nicholson J. Eastman, "Vitamin K and the Newborn."——The Maryland Academy of Medicine and Surgery was addressed October 17 in Baltimore by Drs. Maurice Feldman, Baltimore, on "Aneurysms of the Abdominal Aorta"; Charles W. Maxson, "Early Treatment of Fractures," and J. Bernard Wells, state's attorney, "The Doctor on the Stand."

Dr. Corner to Head Department of Embryology.—Dr. George W. Corner, since 1924 professor and chairman of the department of anatomy of the University of Rochester School of Medicine, Rochester, N. Y., has been appointed director of the department of embryology of the Carnegie Institution of Washington, effective May 1, 1940, on the retirement of Dr. George L. Streeter, who joined the Carnegie staff in 1914 and became director of the department of embryology in 1917. The Carnegie laboratory of embryology is located in Baltimore. Dr. Corner was born in Baltimore. He graduated at Johns Hopkins in 1913. Before going to Rochester in 1924 he served as assistant professor at the University of California Medical School and associate professor at Johns Hopkins. He has been curator of the Rochester Medical Library since 1938, was secretary-treasurer of the American Association of Anatomists from 1930 to 1938 and since early this year has been managing editor of the *American Journal of Anatomy*.

MASSACHUSETTS

Postgraduate Courses.—The Massachusetts Medical Society, cooperating with the state department of health, the U. S. Public Health Service and the Federal Children's Bureau, opened its fall series of medical postgraduate extension courses in October. They will continue at weekly intervals until December.

Harvard Will Not Abandon Dental School.—To correct a rumor that has been circulating, Harvard University announces that plans are not under way to abandon its dental school after seventy years' existence. According to Dr. Leroy M. S. Miner, dean of the dental school, a plan is under consideration involving a new program of dental education, but this does not include the abandonment of the dental school. The usual first year class was accepted this year with a full quota of students and this class will be carried through the entire four years under the present framework, it was stated. According to a release from the university, there is no truth in the statement as applied to the present situation, or to the contemplated new plan, that "All candidates contemplating the study of dentistry must first enroll and qualify by acquiring the degree of doctor of medicine, before entering on the study of dentistry." It was pointed out that whatever new plan is adopted it will still be possible for men to qualify for general dental practice and to satisfy requirements for licensure. The statement that the university is going to discontinue teaching prosthetic and other forms of restorative dentistry and confine itself simply to preparing men for surgery and other specialties is not true. The dental profession may rest assured that any modifications in the curriculum now under consideration will, if put into effect, be expected to elevate the importance of dentistry as a profession and neither to lower its standards nor to diminish its effectiveness, it was stated.

MICHIGAN

Symposium on Poliomyelitis.—The Wayne County Medical Society sponsored a symposium on poliomyelitis at the Detroit Institute of Art November 13. The speakers were:

Dr. Edgar E. Martmer, Clinical Aspects and Diagnosis.
Dr. Franklin H. Top, Epidemiology.
Dr. Joseph A. Kasper, Virology and Pathology of Anterior Poliomyelitis.
Dr. Alfred D. LaFerte, After-Treatment from Orthopedic Standpoint.

Hospital Day.—Woman's Hospital, Detroit, sponsored a "hospital day" November 8. The speakers included Drs. George M. Curtis, Columbus, on "The Iodine Metabolism in Thyroid Disease, Emphasizing the Clinical Aspects"; William Boyd, Toronto, Canada, "Some Reasons for the Recent Increase of Bronchial Carcinoma"; John L. McKelvey, professor of obstetrics and gynecology, University of Minnesota Medical School, Minneapolis, "A Study of the Remote Lesions of the Pregnancy Toxemias and Their Clinical Significance"; Arthur H. Parmelee, Chicago, "Practical Points in the Management of the Newborn." Dr. Boyd discussed "Cause and Effect in Disease" at the dinner meeting in the evening.

Changes in Health Officers.—Dr. Fred O. Tonney, Washington, D. C., and formerly with the city health department of Chicago, has been assigned as health commissioner of Delta County during the leave of absence of Dr. Roelof Lanting, Escanaba. Dr. Clifton F. Hall, Topeka, Kan., director of the division of tuberculosis control for the state board of health, will serve as director of the Mecosta-Osceola health department during the absence of Dr. Max C. Igloe, Big Rapids,

who is studying at Johns Hopkins University, Baltimore. While Dr. Lloyd H. Gaston, Sandusky, director of the Sanilac County department of health, is pursuing a course at Yale University during the coming months, Dr. James A. Dolce, Allegan, will serve as acting director.

MINNESOTA

Dr. McQuarrie Goes to Peiping.—Dr. Irving McQuarrie, professor and head of the department of pediatrics at the University of Minnesota School of Medicine, Minneapolis, will go to China about January 1 to serve as visiting professor in pediatrics at Peiping Union Medical School, according to the *Journal-Lancet*. Dr. McQuarrie was granted a leave of absence by the university board of regents and will return to the university next year, it was stated.

Course in Neurologic Roentgenology.—The University of Minnesota, Minneapolis, sponsored a course in neurologic roentgenology at the Center for Continuation Study November 13-15. The speakers included:

Andrew T. Rasmussen, Ph.D., and Dr. Leo G. Rigler, Minneapolis, Anatomy of Brain, Skull and Spine.
Dr. James W. Kernohan, Rochester, Pathology of Tumors of the Brain and Spinal Cord.
Dr. Cornelius G. Dyke, New York, Normal Encephalogram and Ventriculogram.
Dr. John D. Camp, Rochester, Normal and Abnormal Sella.
Dr. Merrill C. Sosman, Boston, Meningiomas and Lesions of the Calvarium Including Fractures.
Dr. Harold O. Peterson, Minneapolis, Platybasia; Encephalography in Spastic, Mentally Deficient and Epileptic Children.

A symposium on tumors of the brain was presented by Drs. Sosman, John Charnley McKinley, Minneapolis, and Alfred W. Adson, Rochester, and one on protruded intervertebral disks by Drs. Maurice N. Walsh, Ralph K. Ghormley, J. Grafton Love, Rochester, and Dr. Camp. A clinical pathologic conference was conducted by Drs. Dyke, Camp, Peterson, Sosman and Abe B. Baker, Minneapolis.

MONTANA

Personal.—Dr. Enoch M. Porter, Great Falls, has been named vice president of the state board of health, filling the unexpired term of the late Dr. Louis H. Fligman, Helena. ——Dr. Patrick E. Kane, Butte, has been appointed a member of the state board of medical examiners for a term to end March 2, 1945. He succeeds the late Dr. John A. Donovan.

NEW YORK

Hospital Superintendents Transferred.—Dr. John A. Pritchard, superintendent of Buffalo State Hospital, Buffalo, has been transferred to the superintendency of the St. Lawrence State Hospital, Ogdensburg, to succeed Dr. Paul G. Taddiken. Dr. Willis E. Merriman, head of Manhattan State Hospital, has been transferred to the Utica State Hospital.

Society News.—Dr. Eugene N. Boudreau, Syracuse, addressed the Onondaga County Medical Society, Syracuse, November 7 on "The Medical and Social Challenge of Alcoholism"; Dr. Robert C. Schwartz reported a case of Laurence-Moon-Biedl syndrome (blindness of pituitary origin).——Drs. Edward S. and John Van Duyn II addressed the Syracuse Academy of Medicine November 21 on "Pulmonary Atelectasis Following Severe Trauma" and Clayton A. Sayers, D.D.S., on "The Relation of the Physician to Orthodontia."

Health Supplement.—The second annual health section of the Nassau *Daily Review-Star* was published October 31. All the material in the supplement, which consisted of forty pages in tabloid style, was approved before publication by the Nassau County Medical Society. The first article in the section described in detail the organization setup and activities of the American Medical Association. One of the other important articles dealt with the National Health Program and pointed out the position of the medical profession in relationship to the program.

New York City

Society for Study of Syphilis.—The New York office of the U. S. Public Health Service is sponsoring the formation of a Society for the Study of Syphilis for all physicians in the city who are interested in diagnosis and treatment of syphilis. The basic program will be by and for the general practitioner. Informal meetings are planned at which physicians may discuss their problems.

Annual Hospital Campaign.—The United Hospital Fund is conducting its sixty-first annual campaign for funds to meet the needs of the ninety voluntary hospitals that are members of the organization. The amount needed this year is $2,462,618, it was announced. Money received in the campaign is distributed through a special committee which allots funds to member hospitals on the basis of free care rendered, special needs and budgetary requirements of their women's committees. The greater part is used to provide free care for the needy.

Dr. Squier Retires.—Dr. J. Bentley Squier, professor of urology, Columbia University College of Physicians and Surgeons since 1917, has retired, the New York *Times* reports. Dr. Squier, 66 years old, took his medical degree at Columbia in 1894 and was professor of genito-urinary surgery at New York Post-Graduate Medical School from 1909 to 1924. He has in recent years been director of the Squier Urological Clinic at Presbyterian Hospital, consulting surgeon to St. Luke's Hospital and consulting urologist to Roosevelt Hospital and the Neurological Institute. He was president of the American Urological Association in 1913 and of the American Association of Genito-Urinary Surgeons in 1919.

Hospital Lecture Series.—The Journal Club of Montefiore Hospital began its lecture season October 5 with an address by Dr. Esmond R. Long, Philadelphia, on "Primary Tuberculosis in the Adult." Dr. John F. Fulton, New Haven, spoke November 8 on "The Hypothalamus," and Dr. Hugh R. Butt, Rochester, Minn., November 30 on "The Use of Antihemorrhagic Substance (Vitamin K) in the Treatment of Hemorrhagic Diathesis Associated with Hypoprothrombinemia." Other lectures that have been announced are:

Drs. Alexander B. Gutman, Clinical and Chemical Aspects of Hyperparathyroidism; and Henry L. Jaffe, Pathology of Hyperparathyroidism, Jan. 17, 1940.
Dr. Virgil H. Moon, Philadelphia, Shock: Its Mechanism, Pathology and Occurrence, February 7.
Dr. Francis Peyton Rous, Viruses and Tumor Causations, February 28.
Dr. Maurice Lenz, Radiotherapy: Its Actions and Medical Applicability, March 18.

Society News.—Drs. Richard B. Cattell, Boston, and Frank E. Adair addressed the Medical Society of the County of Queens October 31 on "Carcinoma of the Colon and Rectum" and "Treatment of Cancer of the Breast" respectively.——Drs. Herbert M. Evans, Berkeley, Calif., and James B. Collip, Montreal, Canada, addressed the Medical Society of the County of New York October 23 on "Historical Sketch of the Development of Endocrinology" and "Physiology of the Anterior Lobe of the Pituitary Gland" respectively.——A symposium on "Inflammatory Lesions of the Colon" was presented before the New York Surgical Society October 25 by Drs. Carl Eggers, John H. Garlock, William Howard Barber and Wallace B. Murphy.——Drs. Edwin F. Gray and Murray M. Friedman, among others, addressed the New York Roentgen Society November 20 on "Roentgen and Histologic Studies of Calcification in the Spleen" and "Anomalies of the Cervical Spine" respectively.——Drs. Dorothy H. Andersen and Jean R. Oliver addressed the New York Pathological Society November 30 on "Renal Parathyroidism in Childhood" and "The Architecture of the Amyloid Kidney" respectively.——Drs. Frank R. Smith and Oswald S. Lowsley addressed the Harlem Medical Association November 1 on "Cancer in Gynecology" and "Newer Aspects of Urologic Surgery" respectively.

NORTH CAROLINA

Personal.—Dr. Joseph B. Greene, Asheville, was honored at a testimonial dinner November 8 following his retirement from active practice. Dr. Jere E. Cocke was toastmaster and with Drs. John La Bruce Ward and Paul H. Ringer described Dr. Greene's practice of nearly fifty years.

Diploma Lost.—Dr. Milton Carpinter Cobey, Washington, D. C., who graduated from Duke University School of Medicine, Durham, Sept. 1, 1934, has recently lost his diploma bearing that date. The university has notified the association that a new diploma has been issued to Dr. Cobey.

New Building to Be Opened at Carolina.—A new Medical Laboratories Building is to be opened December 4 at the University of North Carolina, Chapel Hill, as part of the university's sesquicentennial celebration. The exercises will begin with an address in the morning by Dr. Eli K. Marshall Jr., Baltimore, on "Medical Research: The Story of Sulfanilamide." In the afternoon Dr. David Riesman, Philadelphia, will speak on "The Making of a Clinician" and Dr. G. Canby Robinson, Baltimore, on "The Application of Medical Science to the Individual." Then will follow an informal tea in conjunction with the inspection of the medical laboratories and the medical dormitory. At a dinner in the evening Dr. Frank

G. Boudreau, executive director of the Milbank Memorial Fund, New York, will speak on "New Health Frontiers." Greetings will be brought to the university and medical school by various alumni and friends.

OKLAHOMA

Society News.—The Tulsa Cancer Society presented a symposium on "Malignancies of the Breast" before the Garfield County Medical Society, Enid, October 26; the speakers were Drs. Ralph A. McGill, Davy L. Garrett, Carl J. H. Hotz, Ivo A. Nelson, Arnold D. Piatt and Harry D. Murdock. All are from Tulsa.

New County Health Officers.—The state health commissioner recently announced appointment of the following new health officers:

Dr. William E. Seba, Leedey, of Dewey County.
Dr. Rudolph H. Dorwall, Miami, of Ottawa County.
Dr. Leo R. Evans, Pryor, of Mayes County.
Dr. James T. McInnis, Muskogee, of Muskogee County.
Dr. O. Hiram Cowart, Bristow, of Creek County.
Dr. Ivan E. Bigler, Ada, of Pontotoc County.

OREGON

Society News.—A program on common eye diseases, sponsored by the Oregon Academy of Ophthalmology and Otolaryngology, was presented before the Multnomah County Medical Society, Portland, November 1 by Drs. Edgar Merle Taylor, Augustus B. Dykman and Frederick A. Kiehle. All are of Portland. Drs. Joyle O. Dahl, and Morton J. Goodman, Portland, addressed the county medical society, Portland, November 15 on "Significance of Serological Reports for Syphilis" and "Prevention and Management of Reactions and Complications of Syphilotherapy" respectively.

PENNSYLVANIA

Postgraduate Meeting at Danville.—The annual fall postgraduate assembly at Geisinger Hospital, Danville, was held October 20 with the following program:

Dr. Charles W. Mayo, Rochester, Minn., Carcinoma of the Right Half of the Colon.
Dr. Arthur W. Allen, Boston, Diagnostic Clinic.
Dr. Russell L. Cecil, New York, Treatment of Pneumonia.
Dr. Harold L. Foss, Danville, End-Results Following Surgical Treatment of Carcinoma of Rectum.
Dr. Roy E. Nicodemus, Danville, Management of Occiput Posterior Positions.

Philadelphia

Tuberculosis Conference.—The annual Philadelphia Tuberculosis Conference, sponsored by the Philadelphia Health Council, the department of public health, the Philadelphia County Medical Society, the Pennsylvania Tuberculosis Society and the Philadelphia Association of Tuberculosis Clinics and other agencies, was held November 14 at the Ritz-Carlton Hotel. At the morning session Dr. Esmond R. Long led a discussion of "Tuberculosis Testing and X-Ray Examinations"; Mrs. Sadie Orr Dunbar, Portland, Ore., president of the General Federation of Women's Clubs, was among the speakers at the luncheon, and Dr. Samuel J. Dickey, director of the tuberculosis division of the state department of public health, Harrisburg, spoke on "Tuberculosis from an Administrative Standpoint."

Pittsburgh

Society News.—Speakers at a meeting of the Allegheny County Medical Society November 21 were Drs. James Leroy Foster on "The Feeding of Infants and Children"; Joseph M. Cameron, "An Autogenous Serum for the Treatment of Menstrual Migraine"; Eben W. Fiske, "Functional Treatment of Fractures and the Combined or Rotating Traumatic Service," and George J. Kastlin, "Effects of Certain Drugs on the Hematopoietic System."

SOUTH CAROLINA

County Society to Celebrate Sesquicentennial.—The Medical Society of South Carolina, which embraces the territory of Charleston County, will celebrate its sesquicentennial anniversary in Charleston December 5 with a historical exhibit and a banquet. The exhibit will be at the Gibbes Art Gallery, showing paintings, books, prints and other material relating to the society's background and its early members. Mayor Henry W. Lockwood of Charleston and Governor Burnet R. Maybank will make addresses of welcome at the banquet, which is to be held at the Francis Marion Hotel. Dr. James J. Ravenel, Charleston, president of the society, will give a historical sketch of the society. Dr. Douglas Jennings, Bennettsville, president of the South Carolina Medical Association, will bring greetings, and Dr. William Weston, Columbia, will present a tablet from the state association. Dr. Nathan B. Van Etten, New York, President-Elect of the American Medical Association, will speak on "An American Health Program" and Dr. Francis R. Packard, Philadelphia, editor of the *Annals of Medical History*, on "Scientific Links Between Charleston and Philadelphia in the Eighteenth Century." The Medical Society of South Carolina was founded Dec. 24, 1789, the first and for many years the only medical organization in the state. The society from its beginning conducted a public dispensary and now owns and operates the Roper Hospital. It also started a collection of books in its early days. In 1822 a medical college was established under the auspices of the society, which conducted the school until it assumed its present status and name, the Medical College of the State of South Carolina. Two medical journals, the *Carolina Journal* and the *Southern Medical and Surgical Journal*, were products of the members of the medical society, according to an announcement. The society still has the original minutes of its meetings from the time of its establishment and the new member today signs his name in the book in which the minutes of the first meeting were written.

TEXAS

Personal.—Dr. Houston H. Terry, formerly of Fort Worth, has been appointed director of the health unit of Cooke County. ——Dr. John G. Young, Dallas, has been selected as chief of staff of the Texas Children's Hospital now under construction, it is reported.

Society News.—At a meeting of the Dallas County Medical Society November 9 the speakers were Drs. Charles D. Bussey on "Meckel's Diverticulum—a Pathological and Clinical Study of 155 Cases"; James Howard Shane, "Cold Punch Type Transurethral Prostatic Resection," and Merritt B. Whitten, "Midaxillary Leads in the Electrocardiogram in Infarction and Hypertension."

WASHINGTON

Children's Library Is Memorial to Physician.—A library of children's books is being placed in the Spokane unit of the Shriners' Hospital for Crippled Children as a memorial to the late Dr. Mitchell Langworthy. A fund was collected shortly after Dr. Langworthy's death in 1929 but was saved until a new hospital was built. From this fund a room has been furnished as a library and schoolroom and books have been bought. Dr. Langworthy was chief surgeon of the hospital from 1926 till 1929, when he was shot and killed at the age of 38 by a patient.

Society News.—Dr. Kenneth K. Sherwood, Seattle, addressed the Walla Walla Valley Medical Society, Walla Walla, at its November meeting on "Pathology and Treatment of Chronic Arthritis."——A symposium on cardiac conditions was presented at a meeting of the King County Medical Society, Seattle, November 6 by Drs. Charles E. Watts, who discussed "Cardiac Arrhythmias"; Raymond H. Somers, "Approach to the Cardiac Problem in Children," and Austin G. Friend, "The Heart Patient."——Dr. Frank S. Miller addressed the Spokane County Medical Society, Spokane, November 9 on tuberculosis.

Executives' Conference.—The second annual meeting of the Pacific States Medical Executives' Conference will be held in Seattle December 10. Membership in this conference includes officials of the state medical associations of California, Oregon, Idaho, Washington and Montana. It is expected that representatives may come this year from Arizona, Nevada and Utah. Dr. Harry E. Rhodehamel, Spokane, is president. Matters selected for discussion include: professional societies (the Oregon Plan), medical service plans, malpractice defense problems, prospective health legislation, public relations, prospective public health and practice laws of the Pacific states, postgraduate medical education.

WISCONSIN

County Secretary for Thirty-Five Years.—Dr. Mina B. Glasier, Bloomington, resigned as secretary of the Grant County Medical Society October 31 after serving continuously for thirty-five years. Dr. Glasier was a member of the state board of health for fourteen years. In 1932 she received the Council Award of the State Medical Society of Wisconsin for meritorious service.

Society News.—Dr. David R. Lyman, Wallingford, Conn., was guest speaker at the banquet during the annual meeting of the Wisconsin Anti-Tuberculosis Association in Milwaukee

October 26, giving a memorial address on the late Dr. Hoyt E. Dearholt, for many years executive secretary of the association. Dr. Paul A. Teschner, assistant director, Bureau of Health Education, American Medical Association, Chicago, led a panel discussion on the problem of finding early diagnosis. —— Dr. David A. Cleveland, Milwaukee, addressed the Marinette-Florence County Medical Society, Menominee, October 18 on "Head and Spinal Injuries."——Drs. Milton Trautmann, Madison, and Frances A. Cline, Rhinelander, addressed the Oneida-Vilas County Medical Society, Rhinelander, November 2 on "Modern Treatment of Venereal Disease" and "Poliomyelitis" respectively.

GENERAL

Fraternity Convention.—The Phi Delta Epsilon Medical Fraternity will hold its thirty-sixth annual convention at the Waldorf-Astoria Hotel, New York, December 29, 30 and New Year's Eve. About 600 physicians and medical students from this country and Canada will attend. Dr. Morris Fishbein, Editor of THE JOURNAL, who is national president, will preside at the sessions.

Help Wanted in Finding Illegal Practitioner.—The prosecuting attorney of the Seventeenth Judicial District of Indiana requests the help of the medical profession in apprehending a man wanted on charges of abortion and illegal practice of medicine. Under the name of Ferdinand Werner, this man has maintained an office in Richmond, Ind., as a pathologist and bacteriologist and has practiced medicine without a license. After many efforts, evidence was obtained recently

to support thirteen charges of illegal practice against him and later charges of abortion were filed. The abortion charge was set for trial in the Wayne Circuit Court November 13, but Werner did not appear, forfeiting a $2,000 bond. No date has been set for trial on the other charges, but authorities believe Werner will forfeit a $1,300 bond on these charges. Routine check of the man's fingerprints revealed that he had been convicted of a crime involving moral turpitude in Cleveland in 1923, sentenced to the state penitentiary, from which he escaped in February 1924. Shortly afterward he was employed in the department of pathology and bacteriology at Indiana State University School of Medicine for less than three months and later at the State Hospital for the Insane at Richmond. He was discharged from the latter position when the superintendent learned Werner was not his real name and when his services were found unsatisfactory. He then opened his own laboratory in Richmond. When Werner was convicted in Cleveland he was using the name Sternisa and further inquiry brought out the fact that he had come to the United States under the name of Hribar. The Indiana authorities believe that because of Werner's medical work he will undertake such work again and will have contact with the medical profession. If he is identified, the person making identification is asked to telegraph the information collect to the prosecuting attorney's office at Richmond. The description given by police is as follows: 42 years old; 5 feet 11¼ inches tall; weight 197 pounds; black hair, brown eyes and fair complexion.

Fellowships for Study of Crippled Child.—For the third year the Nemours Foundation will award five or six one-year fellowships for laboratory or clinical studies on the crippled child, to begin on or after July 1, 1940. The term "crippled child" is used in its broadest sense, according to the announcement. The amount of each individual award will be from $1,000 to $2,400 and will be determined on the basis of the previous training of the applicant and the type of research project selected. Application blanks may be obtained from the secretary of the research committee, Dr. Alfred R. Shands Jr., 803 Delaware Trust Building, Wilmington, Del.

Southern Surgical Meeting.—The fifty-second annual session of the Southern Surgical Association will be held in Augusta December 5-7 with headquarters at the Forest Hills Hotel. Among the speakers will be:

Dr. Waltman Walters, Rochester, Minn., Operative and Postoperative Infections with Special Reference to Air-Borne Bacterial Contaminations.
Dr. Barney Brooks, Nashville, Tenn., Present Status of the "Radical Operation" for Carcinoma of the Breast.
Dr. Carrington Williams, Richmond, Va., Hysterical Edema of the Hand and Forearm.
Dr. Warfield M. Firor, Baltimore, Treatment of Addison's Disease by Implantation of Synthetic Hormone.
Dr. Thomas D. Sparrow, Charlotte, N. C., Leukoplakic Vulvitis.

At the annual dinner Dr. Hubert A. Royster, Raleigh, N. C., will be toastmaster and Dr. Albert O. Singleton, Galveston, Texas, will deliver the presidential address on "The Surgeon in the Romantic Story of Texas."

Grants for Research in Endocrinology.—Requests to the National Research Council committee for research in endocrinology for aid during the fiscal period from Sept. 1, 1940, to June 30, 1941, will be received until Feb. 29, 1940. In addition to a statement of the problem and research plan or program, the committee desires information regarding the proposed method of attack, the institutional support of the investigation and the uses to be made of the sum requested. No part of any grant may be used for administrative expenses. Applications for aid of endocrine research on problems of sex in the narrower sense cannot be given favorable consideration, but the committee will consider support of studies on the effects of hormones on nonsexual functions, for instance, on metabolism. Application blanks may be obtained by addressing the division of medical sciences, National Research Council, 2101 Constitution Avenue, Washington, D. C.

CANADA

Personal—Dr. Allan C. Rankin, dean of the University of Alberta Faculty of Medicine, Edmonton, has joined the military forces of Canada and Dr. John James Ower has been made acting dean for the present session.

Society News.—Prof. George Grey Turner, London, England, addressed the Academy of Medicine of Toronto, October 12 on "Difficulty in Swallowing." A symposium on the problems related to automobile driving was presented before a joint meeting of the section on preventive medicine and hygiene and the section of neurology and psychiatry by Drs. Kenneth G. Gray on the medicolegal and financial aspects; Robert G. Armour, the neurologic problems, and L. Joslyn Rogers, M.A., the problem of alcohol. —— Dr. Howard C. Taylor Jr., Philadelphia, addressed the Academy of Medicine of Toronto November 7 on "Relationship of the Ovarian Hormone to Reproductive Tract Tumors."

LATIN AMERICA

Poliomyelitis in Brazil.—A cable to the New York *Times* October 20 reported that 115 cases of poliomyelitis with six deaths had occurred in Rio de Janeiro. It was announced that the government was taking measures to prevent spread of the disease.

Society News.—Dr. Francisco Ferreira has been elected president of the Society of Ophthalmology and Otolaryngology of Bahia, Brazil, and Dr. Adroaldo de Alencar secretary. Correspondence should be addressed to the president, Pitanguciras 15, Brotas, San Salvador, Bahia, Brazil.

Leprosarium in Cuba.—The cornerstone was laid recently for a new hospital for lepers near Alto Songo, Orienta, Cuba. It is expected that the new institution will be completed by September 1940. It will accommodate 400 patients and will be designed to permit enlargement to care for 400 more. The building will cost about $380,000.

FOREIGN

Nobel Prizes Awarded.—The 1939 Nobel Prize in chemistry was recently awarded jointly to Prof. Adolph Butenandt of the University of Berlin and Prof. Leopold Ruzicka, Zurich, Switzerland, for their work on hormones. The 1938 chemistry prize was awarded at the same time to Prof. Richard Kuhn of the Kaiser Wilhelm Institute, Berlin, for his work on carotinoids and vitamins. The New York *Times* reported November 11 that Professor Butenandt and Professor Kuhn had declined the prizes because of the ban placed on the Nobel Prizes by the Nazi government.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Nov. 1, 1939.

The Teeth of the Nation Are Bad

The excellent physique of our people and the great improvement in health in recent years, as shown by a lower death rate, infant mortality, maternal mortality and tuberculosis mortality are frequent themes. The good physique of the many thousands of young men called up when this country had recently to adopt conscription is the latest confirmation. But there is one profoundly unsatisfactory condition. Addressing the Public Health Services Congress last year the minister of health said "The teeth of this country are bad; you might almost say they are rotten." In his presidental address to the British Dental Association Mr. T. Walkinshaw laid the blame on our insufficient public dental-health service. We have a school dental service but prevention should begin with the pregnant woman and young children and there is little or no provision for this. Hence the average child enters school with his teeth in an appalling condition. Further, no provision is made for treatment during adolescence. It is curious that in all the discussion of this pressing problem, including that by a leading medical journal, no attempt seems to be made to get to the root of the matter. Why is dental caries so prevalent in civilized countries, while it is absent in people living under primitive conditions? Recent studies in diet appear to furnish an answer. About the middle of the nineteenth century the stone grinders for wheat gave place to steel rollers which remove the whole of the germ and almost all the bran, giving a flour deficient in protein, fat, vitamins A and B and minerals (calcium, phosphorus and iron). In an important book recently published, "The Englishman's Food: A History of Five Centuries of English Diet," the authors (Prof. J. C. Drummond and A. Wilbraham) attribute the appalling prevalence of dental caries to the poorness of white bread in minerals, the reduction in the consumption of milk (with the use of the cheaper forms of condensed milk) and the decline of breast feeding. "Time and again examples can be found of communities with excellent teeth so long as they lived on natural and unrefined foods, but soon after the introduction of highly milled white flour caries appeared."

The Complications of Intranasal Surgery

In a discussion on the complications of intranasal surgery at the Section of Laryngology of the Royal Society of Medicine, Mr. E. D. D. Davis said that a good view of the interior of the nose was essential for operations and that anything in the nature of a blind operation was undesirable. He called attention to four kinds of injuries that had happened in spite of careful technic: perforations and injuries to the roof of the nose or to the cribriform plate, injuries to the orbit and its contents, injury to the optic nerve and injury to the nasolacrimal duct.

Six cases of perforation of the roof of the nose had been recorded and he had seen seven in consultation. They occurred during removal of nasal polypi with forceps or during operation with forceps on the ethmoidal cells for sinus suppuration. The perforation in the removal of polypi was always in the region of the posterior ethmoidal cells, when the forceps was directed upward and backward. It was avoided by directing the point parallel to the roof of the nose. The operator might be unaware that the roof of the nose had been perforated, but escape of cerebrospinal fluid or profuse hemorrhage would be a warning. The patient suffered from shock and after delayed recovery from the anesthetic complained of intolerable headache and was restless and drowsy. Coma rapidly supervened and death occurred within three days, before meningitis had time to develop. The necropsy showed hemorrhage from the posterior ethmoidal artery into the anterior fossa of the skull. The treatment was the external ethmoidal operation and covering the opening in the dura by a fascial graft. The perforation was inaccessible through the nose.

Hemorrhage into the orbit following perforation of the thin os planum of the ethmoid was the commonest injury. It frequently happened during the ethmoidal operation, particularly on the anterior cells and also in the intranasal frontal sinus operation. The "black eye" was typical and the ecchymosis was maximal at the inner canthus, but if the hemorrhage was considerable the eyeball might protrude. This might be increased by emphysema. All that was necessary in most cases was to keep the patient at rest in the sitting posture, with the eye covered by a pad and bandage. The patient should be forbidden to blow his nose for a few days.

Injury to the optic nerve in ethmoidal operations produced immediate blindness. Davis had been able to collect reports of five cases and had seen two of the patients. One injury was caused by evulsion of the middle turbinal and part of the ethmoid in an operation for polypi. Optic atrophy followed, with permanent loss of sight. Such cases showed the need for care in the use of the forceps for evulsion. It was safer to use cutting or punch forceps kept in a plane parallel to the outer wall of the nose.

Injury to the nasolacrimal duct had been seen on two occasions following an intranasal antral operation. The window made in the nasal wall of the antrum extended into the middle meatus above the attachment of the inferior turbinal, severing the duct. On recovering from the operation the patients complained of blood leaking into the eye. Epiphora and lacrimal obstruction followed. After injection of the lacrimal sac with iodized oil, x-ray examination showed stricture of the duct in the middle meatus of the nose. The epiphora was relieved by a dacrocystostomy done above the stricture.

PARIS

(From Our Regular Correspondent)

Oct. 25, 1939.

Plasma Transfusion

P. Brodin and F. Saint Girons, before the Société médicale des Hôpitaux de Paris, stressed the advantage of using not the whole blood but only the plasma in severe hemorrhages. According to their view the danger of hemorrhage lies less in the loss of the erythrocytes than in the loss of the volume of blood. When this is reduced to one fourth, death is inevitable. In war times it may not be possible to use only living blood and recourse to stored blood may be necessary. This involves dangers. R. Benda, at the same meeting, reported the history of a woman aged 52 who had undergone five transfusions of fresh blood within six months in large doses and who died six hours after slow injection of 100 cc. of stored blood of group O taken sixteen days previously. This indicates that stored blood may become toxic and cause fatal hemolysis after a certain time, varying according to the particular case. To avoid these accidents, the origin of which is probably determined by the type of the blood, only the plasma is kept, after centrifugation and separation from the red corpuscles. The plasma can be stored for weeks and months. Unlike the serum, the plasma is not toxic, even if applied to different blood groups. Professor Pittaluga, of Madrid, before the Société de chirurgie, expatiated on the lessons learned regarding blood transfusion during the three years of civil war in Spain. Whether intended for immediate use or for conservation, the blood was subjected to the customary tests including the test for malaria. The blood of universal donors never caused accidents. It is important, he said, to store the blood at a constant temperature of 37.4 F., which required special equipment. Under these conditions its usefulness could be extended to two weeks. Reheated at 100.4 F.

and slowly injected, shocks rarely resulted from the transfusion. Neumann, of Brussels, added confirmation to these observations from his extensive experience.

Effect of Radium on the Tubercle Bacillus

In one of the last sessions of the Académie des sciences, P. Bonet-Maury and H. R. Olivier discussed the effects of the use of radium on the behavior of tubercle bacilli. Their method consists in dissolving the total radiation of the radon in a microbial suspension. With powerful doses the respiration of the irradiated bacillus continues, though reduced to about one sixth, for several days. The bacilli are in a state of "postponed death," still alive but no longer virulent. Owing to the destruction of bacillary virulence while keeping the bacilli alive, the authors were able to bring about the immunization of guinea pigs. In man they obtained encouraging therapeutic results with safety. This "radium vaccine" engenders hopes of interesting developments in the immunization against tuberculosis and in its treatment.

BUCHAREST

(From Our Regular Correspondent)

Oct. 14, 1939.

The Closing of Some Dental Laboratories

The minister of public health has ordered the closing of 123 dental laboratories which were conducted by dental technicians in violation of the law. In 1923 dental technicians obtained permission to practice. However, the law issued by former Minister Saveanu deprived some of them of practice on the ground that they obtained their permission illegally. The dental technicians attacked the law on the ground that it violated their rights, but the supreme court upheld the law. Thereupon a long controversy arose between dental surgeons and dental technicians. The litigation came to an end by the issue of the Moldovan law in 1930. This law favored some dental technicians in that those who in 1930 had been in practice for fifteen years, could take a one year theoretical and practical course and then be examined for license to practice. Those who had practiced fifteen years and already were 42 or more years of age were absolved from attending the course and needed only to pass the examination. As 123 dental technicians did not fulfil this requirement, the minister of health ordered their laboratories to be closed.

Committees Appointed by the Ministry of Health

The government some time ago empowered the Ministry of Health to appoint technical committees to study public health problems and to make proposals regarding most urgent matters needing attention. In all, nineteen committees have been appointed to study typhus fever, malaria, eugenics, maternity and child welfare, insurance against tuberculosis, cancer, venereal diseases, rheumatism, malnutrition and deficiency diseases, and dentistry with especial attention to the function of dental technicians. Committees are also being appointed to stimulate the campaign against alcoholism and trachoma, to promote the standardization of biologic products and to investigate means of fostering international relations in health matters.

Professor Daniel Honored

The Faculty of Medicine of the University of Bordeaux celebrated the conferring on Constantin Daniel, professor of obstetrics and gynecology at the Bucarest University, of the degree of doctor honoris causa. The diploma and the insignia were handed to him in the presence of the deans of all the faculties of Bordeaux University and notables of the city of Bordeaux. Prof. Gabriel Boussagol, rector of the Bordeaux Academy, and Prof. Josef Guyot eulogized the Rumanian savant. Thereupon Prof. Constantin Daniel read an elaborate paper on the influence of French medical sciences on the Rumanian universities.

BERLIN

(From Our Regular Correspondent)

Nov. 1, 1939.

Homeopathy and Lay Practitioners

The Deutscher Centralverein homöopathischer Aerzte recently commemorated its hundredth session. Among the speakers was Prof. Paul Martini, clinician in Bonn, who is known for his thorough critical reexaminations of the therapeutic value of substances designated as medicaments. Retests were necessary, he said, because homeopathy had been vindicated of late years in a number of cases at the hands of the national socialist party, converting some physicians from an attitude of rejection to one of uncritical assent. Plans are being made by the public health department of the reich to conduct an extensive examination of all homeopathic curative procedures.

Recently a meeting also took place of the movement for German public health in Stuttgart. This body represents the so-called lay practitioners (heilpraktiker). Their status in the reich was recently regulated by law (THE JOURNAL, June 10, p. 2449). The presiding officer made several peculiar statements; e. g., that the union between medicine taught in schools and lay medical practice was now completed, the former in future taking over the experiences of lay practitioners; that lay practitioners rejected occult methods as employed in healing by prayer and in remote treatment in accordance with specimens of writing, but not magnetic therapy. Besides they adhered, he said, to ocular diagnosis in spite of medical objections. The 5,000 legalized lay practitioners in Germany are determined to be distinguished from the quacks.

The law regarding lay practitioners also affects all persons who treat speech defects with or without psychic methods, those who professionally occupy themselves with psychotherapy and the psychology of healing, with curative gymnastics and with respiratory cures; likewise professional teachers of vision (seh-lehrer), proprietors of schools of vision (seh-schulen) and those who treat fractures (exclusive of purely orthopedic measures) and those who profess to cure leg and foot troubles (exclusive of pedicures).

Significant for the social alinement of lay practitioners, who come from the lower strata of society, was the announcement of one of the highest medical functionaries of national socialism, Dr. Blome, at last year's congress for internal medicine that it was planned to admit lay practitioners to the sick funds. Whether this was feasible was another question, since lay practitioners might not desire it on account of the low compensations granted by the sick funds. Moreover, he and the medical leadership of the party in power would welcome their admission. In this way, he said, it would not always be the sick fund physician on whose back professional questions are fought out; for, in addition to his low fees, many patients hold him responsible for alleged inferior services provided by the sick funds and for many other things. This frank avowal is quite significant for the attitude of those insured toward the sick fund system in Germany. Dr. Blome is the representative of the state medical leader for medical continuation training. In the meantime, lay practitioners have signified their willingness to participate in sick fund insurance with the declaration, however, that they did not surrender their conviction that their services would before long receive a more just compensation. This implies that they expect better fees than the physicians. Privately managed sick funds, which compensate on a higher scale than those of the state, have already admitted lay practitioners. In the Rudolf Hess Hospital in Dresden an "academy for new German medicine" is to be established. Hess, who is close to Hitler, is the great promoter of all unscientific paramedical movements.

AUSTRALIA

(From Our Regular Correspondent)

Oct. 25, 1939.

Community Plan for Medical Services

Contract practice as a private enterprise has now been commenced in Australia. Medical services at Canberra (the federal capital city of Australia) have been reorganized by the introduction of a community plan on a voluntary basis. Five of the doctors who reside in the capital are conducting the scheme, which is open to all residents earning up to £520 a year and their dependents. Contributions are planned on a sliding scale, with a maximum of £3-3-0 a year for persons with an annual income of £520 and £6-6-0 for these people with their dependents. Liberal benefits are to include unlimited medical benefits during illness, a complete medical overhaul every year, a full service for obstetric cases, assistance when necessary at operations, and medical attendance at doctors' offices or in the homes of contributors between the hours of 8 a. m. and 8 p. m. on week days and until 1 p. m. on Saturdays. Disabilities due to misconduct and injuries or sickness already provided for by insurance are not covered by the scheme. Additional fees may be charged for traveling beyond a 4 mile limit and for urgent attention outside specified hours. The British Medical Association in Australia is following the experiment closely. The city already has a government-controlled compulsory hospital benefit scheme.

War Time Measures in Australia

The spread of war in Europe and the potential danger of war in this country have been responsible for greatly increased activity in air raid precaution work and in other schemes for the protection of civilians in times of emergency. Government and voluntary organizations have instituted instruction classes both for officials and for civilians, and plans for the evacuation of each of the larger cities are well in hand. Extensive plans have also been made for the organization of an emergency blood transfusion service. These include provision for the storage of blood if necessary and the grouping, testing and listing of a large number of donors from both the military and the civilian ranks. Special attention is being given to the feeding of the military forces in Queensland. An increased supply of salad vegetables, fruit, eggs and milk, the substitution of whole meal for white bread, and milk and fruit bars in the canteens are new departures at present under consideration. Consideration has also been given to the emergency organization of the medical profession with due regard to both military and civil needs. Special lectures have been arranged for numbers of the profession on war time medicine and surgery.

Birth Rate Recovery by Australia

While many countries at present are faced with the national problem inherent in a net reproduction rate of less than 1, recent statistics reveal that births in Queensland are well above the level required to fill the places of the present generation. Figures for the whole of Australia show that there has been a recovery practically to the displacement level. A separate calculation for Queensland was first made on the 1938 birth registrations and gave the result of 1.09. A calculation for South Australia gave the low figure of 0.85. The latter may be associated with the fact that 54 per cent of the population of that state lives in the metropolitan area. The latest figure for Australia (1937) is 0.99. Comparisons with the net reproduction rates of other countries give Japan (1930) 1.57, Canada (1931) 1.32, Italy (1937) 1.13, the Netherlands (1937) 1.12, Queensland (1938) 1.09, New Zealand (1938) 1.02, Australia (1937) 0.99, the United States (1935 white population) 0.96, Denmark (1937) 0.95, Germany (1936) 0.93, France (1937) 0.87, Great Britain (1937) 0.80, Sweden (1936) 0.76.

Nutrition in New Zealand

New Zealand has the reputation of being a country that produces a healthy and virile people. Recent inquiries have tended to throw some doubt on this generalization. The "protective foods" are still fairly expensive and as a consequence New Zealanders tend to consume meat as their main first class protein and to bulk their diet with white bread, cakes, cane sugar and tea. New Zealanders are the largest meat eaters in the world (about 250 pounds a head annually). This statement is amply borne out by a survey of food consumption for the last few years. Total food consumption divided by total population shows that each person consumes daily from 6 to 7 ounces of sugar, approximately 1 pound of red meat, a half pound of white flour, two thirds of a pint of milk, two thirds of an egg, one-third ounce of cheese and from 2 to 3 ounces of butter (not margarine). Most of the milk is taken by adults in tea and the egg in cakes.

The available evidence suggests that about 97 per cent of the school children show signs of dental caries and that more than 50 per cent of the adults have false teeth. It is also reported that one in every twenty persons in the country is in the hospital every year, chiefly for such complaints as appendicitis, tonsils and goiter. The adult population also suffers to no inconsiderable degree from digestive complaints, rheumatism and neuritis.

It is interesting to note at what age the breakdown in the health of the children begins to occur. Up to the age of 8 or 10 months most of the children seem to be in good condition. After that age it is customary to cut down the amount of milk, cod liver oil and orange juice, with the result that the calories are obtained mainly from refined starches and the resistance of the child tends to decrease. By the time the children are going to school, dental decay has become common. But for the past two years an additional half pint of milk has been supplied daily in the schools, and this is having a beneficial effect.

Another factor which has an influence on the nutrition of New Zealand is the quantity of cakes and pastry that are consumed. No morning, afternoon or evening gathering is complete without an array of these delicacies, and with the great majority of the population (largely female) they constitute the mainstay of the day. The tea drinking habits are the surprise of every visitor; strong tea, often plentifully sugared, accompanies every meal, even dinner.

Summing up the nutritional problems of New Zealand, it is suggested that (1) calories are adequate, (2) first class protein is adequate but ill chosen, and (3) vitamins B_1 and D are suboptimal, as are iron, calcium and iodine. This situation is brought about by a combination of poor knowledge of nutritional science and of the relatively high price of many of the protective foodstuffs. Home science has always been a feature of the University of Otago, and extension activities are in operation. Nutrition education has been furthered by the Women's Food Value League, on the executive committee of which are British Medical Association members. There are scattered foci of reform such as the Auckland Boy's Grammar School the results of which have been stimulating.

Marriages

ELSIE G. WESTLEY, San Antonio, Texas, to Capt. E. F. Adams of Fort Sam Houston, September 2.

OSCAR MILTON MARCHMAN JR., Dallas, Texas, to Miss Mary Alice Yates of Longview, September 7.

WARREN D. HANSEN to Miss May Winthers, both of Wisner, Neb., August 25.

WOODROW W. SCHMELA to Miss Dora Larson, both of Omaha, September 3.

Deaths

Martha Wollstein, Grand Rapids, Mich.; Woman's Medical College of the New York Infirmary for Women and Children, New York, 1889; at one time demonstrator in histology and demonstrator in pathology at her alma mater; formerly assistant clinical professor of diseases of children and pathology, Columbia University College of Physicians and Surgeons, New York; member of the American Pediatric Society; associate of the Rockefeller Institute for Medical Research from 1906 to 1921; for many years on the staff of the Babies Hospital, New York; aged 70; died, September 30, in the Mount Sinai Hospital, New York.

Allan Joseph Hruby ● Chicago; University of Illinois College of Medicine, Chicago, 1913; fellow of the American College of Physicians; school health officer, 1916-1917; dispensary physician to the Chicago Municipal Tuberculosis Sanitarium, 1917-1918, superintendent, 1918-1923, and secretary and member of the board of directors since 1931; aged 49; at various times on the staffs of Cook County Hospital, St. Anthony's Hospital and the Washington Boulevard Hospital, where he died, November 18, of lobar pneumonia.

Herbert Preston Leopold, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1896; clinical professor of surgery at his alma mater; fellow of the American College of Surgeons; surgeon to the Homeopathic State Hospital, Allentown; consulting surgeon to the Coatesville (Pa.) Hospital, West Jersey Homeopathic Hospital, Camden, and the Homeopathic Hospital, Wilmington, Del.; aged 65; died, September 21, at his summer home in Tannersville, Pa., of acute coronary thrombosis.

Milford Levy ● Baltimore; College of Physicians and Surgeons, Baltimore, 1915; member of the American Psychiatric Association; assistant professor of neurology at the University of Maryland School of Medicine and College of Physicians and Surgeons; served during the World War; on the staffs of the Mercy, University, South Baltimore General, Sinai, Bon Secours and St. Agnes' hospitals; aged 47; died, October 10, in Pikesville, Md., of rheumatic cardiovascular disease and aortic stenosis.

Michael Matthew Jordan ● Worcester, Mass.; University of Minnesota College of Homeopathic Medicine and Surgery, Minneapolis, 1905; member of the American Psychiatric Association and the New England Society of Psychiatry; served during the World War; aged 55; on the staffs of St. Vincent's Hospital and the City Hospital, where he died, September 30, of coronary thrombosis.

Harry Roland Lickle ● Baltimore; Maryland Medical College, Baltimore, 1909; assistant in medicine from 1920 to 1923 and instructor in medicine 1923-1924, University of Maryland School of Medicine; on the visiting staffs of the University, Mercy, St. Agnes', Maryland General, Women's and the West Baltimore General hospitals; aged 50; died, September 13, of cerebral hemorrhage.

Oran Idnire Cutler ● Loma Linda, Calif.; College of Medical Evangelists, Loma Linda, 1924; professor of pathology and bacteriology at his alma mater; member of the American Society of Clinical Pathologists; on the staffs of the Los Angeles General Hospital, Riverside County Hospital, Arlington, and San Bernardino (Calif.) County Hospital; aged 39; died, September 15.

Frank M. Register, Kinston, N. C.; Kentucky School of Medicine, Louisville, 1893; member of the Medical Society of the State of North Carolina; for many years connected with the state board of health; formerly health officer of Wayne County; medical superintendent of the Caswell Training School; aged 69; died, September 28, of intestinal obstruction and chronic myocarditis.

Edward McCarty Armstrong ● Houston, Texas; University of Virginia Department of Medicine, Charlottesville, 1892; fellow of the American College of Surgeons; member of the visiting staff of St. Joseph's Infirmary and Methodist Hospital; surgeon to the Memorial Hospital; consulting surgeon to the Jefferson Davis Hospital; aged 68; died, October 7.

Charles Tilden Howard, Hingham, Mass.; Boston University School of Medicine, 1898; professor emeritus of surgery at his alma mater; member of the Massachusetts Medical Society; fellow of the American College of Surgeons; consulting surgeon to the Massachusetts Memorial Hospitals; aged 67; died, September 6.

Winfield Harrison Ammarell ● Birdsboro, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1909; past president of the Berks County Medical Society; at one time county coroner; president of the board of health and member of the school board; aged 56; died, September 1, of Hodgkin's disease.

Albert Ridgeley, Washington, D. C.; Howard University College of Medicine, Washington, 1900; associate professor emeritus of anatomy at his alma mater; for many years health inspector in the public schools; served during the World War; aged 63; died in September at the Veterans Administration Facility.

Albert Edwin Leach, Mount Morris, N. Y.; New York Homeopathic Medical College and Hospital, New York, 1891; member of the Medical Society of the State of New York; health officer; aged 73; died, September 8, in the Wyoming County Community Hospital, Warsaw, of coronary thrombosis.

Fred Allen Fuller, Jacksonville, Texas; University of the South Medical Department, Sewanee, Tenn., 1908; member of the State Medical Association of Texas; aged 55; on the staff of the Nan Travis Memorial Hospital, where he died, October 7, of chronic hypertension and nephritis.

George Holt Barksdale ● Charleston, W. Va.; Northwestern University Medical School, Chicago, 1908; served during the World War; fellow of the American College of Physicians; on the staffs of the Charleston General and St. Francis hospitals; aged 57; died, October 8.

Lorenzo W. Swope ● Pittsburgh; Western Pennsylvania Medical College, Pittsburgh, 1896; fellow of the American College of Surgeons; for many years on the staff of the Western Pennsylvania Hospital; aged 76; died, September 14, of cerebral hemorrhage and arteriosclerosis.

Winfred Wylie ● Phoenix, Ariz.; Rush Medical College, Chicago, 1877; Long Island College Hospital, Brooklyn, 1878; fellow of the American College of Surgeons; past president of the Arizona State Medical Association; also a lawyer; aged 84; died, September 23, in Glendale, Calif.

Louis Augustus Fuerstenau, Milwaukee; Northwestern University Medical School, Chicago, 1909; president of the Milwaukee Society of Clinical Surgery; aged 58; on the staff of St. Mary's Hospital, where he died, September 21, of benign tumor of the pyloric end of the stomach.

George Washington Cassady, Chicago; Jenner Medical College, Chicago, 1900; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1908; aged 72; on the staff of St. Elizabeth's Hospital, where he died, October 10, of pernicious anemia.

Lot Richard Henry, North Middletown, Ky.; Kentucky University Medical Department, 1902; member of the Kentucky State Medical Association; formerly mayor and member of the school board; aged 65; died, October 9, of coronary occlusion, mitral stenosis and hypertension.

William Stephen Beck, Indianapolis; Medical College of Indiana, Indianapolis, 1888; member of the Indiana State Medical Association; formerly a lawyer; at one time county coroner and secretary of the county board of health; aged 76; died, October 6, of heart disease.

Mary Angela Spink, Indianapolis; Medical College of Indiana, Indianapolis, 1887; member of the Indiana State Medical Association; president and medical director of the Dr. W. B. Fletcher's Sanatorium; aged 75; died, September 3, in Lisbon, N. H., of heart disease.

Robert Swift Patten, Danville, Pa.; Jefferson Medical College of Philadelphia, 1901; member of the Medical Society of the State of Pennsylvania; for many years physician for the public schools; aged 65; was found dead in bed, September 26, of coronary thrombosis.

John Macaulay Gunning, Spokane, Wash.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1902; aged 72; died, October 7, at the Deaconess Hospital of chronic myocarditis, mitral regurgitation and cholangeitis.

Sarah Louise Weintraub, Philadelphia; Woman's Medical College of Pennsylvania, Philadelphia, 1883; member of the Medical Society of the State of Pennsylvania; formerly a medical missionary in Syria; aged 78; died, September 11, in Avalon, N. J.

Joseph Lawrence Morrissey, Elmhurst, N. Y.; Long Island College Hospital, Brooklyn, 1916; served during the World War; aged 48; on the staff of the Flushing (N. Y.) Hospital, where he died, September 12, of acute pancreatitis.

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Lawson Walter McKenzie, Washington, D. C.; Medical College of Indiana, Indianapolis, 1904; formerly physician in the insurance service of the Veterans Administration; aged 61; died, September 20, of coronary occlusion and arteriosclerosis.

George R. Herkimer, Dowagiac, Mich.; Hahnemann Medical College and Hospital, Chicago, 1890; served during the World War; at various times member of the school board, and mayor; aged 73; died, October 1, of cerebral embolus.

Irving C. Wood, Omaha; Jefferson Medical College of Philadelphia, 1880; at one time mayor of Logan, Iowa; aged 82; died, September 7, in the Nebraska Methodist Episcopal Hospital and Deaconess Home of myasthenia gravis.

John Jacob Fossler, Millard, Neb.; University of Nebraska College of Medicine, Omaha, 1907; for many years a member of the school board; aged 62; died, September 27, in the Immanuel Hospital, Omaha, of myasthenia gravis.

Loring Watson Turrell, Smithtown Branch, N. Y.; Yale University School of Medicine, New Haven, Conn., 1936; member of the Medical Society of the State of New York; aged 30; died, September 8, of idiopathic pneumothorax.

William Dana Pursel ● Phillipsburg, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1901; aged 64; died, September 18, in the Easton (Pa.) Hospital of an overdose of morphine, self administered.

John Franklin Calbreath, Portland, Ore.; University of California Medical Department, San Francisco, 1875; member of the Oregon State Medical Society; aged 85; died, October 4, of hemorrhage from an esophageal varix.

Kenneth Israel Hoffman ● New York; Cornell University Medical College, New York, 1921; on the staff of the New York Polyclinic Medical School and Hospital; aged 42; died, October 10, in a local hospital.

George Yerkes Woodland, Philadelphia; Medico-Chirurgical College of Philadelphia, 1895; for many years a medical inspector in the public schools; served during the World War; aged 72; died, September 10.

William S. Higbee, Philadelphia; Jefferson Medical College of Philadelphia, 1883; member of the Medical Society of the State of Pennsylvania; aged 77; died, September 12, in the Methodist Hospital.

Owa O. Hausch, Painesville, Ohio; Cleveland Medical College, 1891; member of the Ohio State Medical Association; for many years county coroner; aged 74; died, October 14, of coronary thrombosis.

Clifford Mitchell, Chicago; Chicago Homeopathic Medical College, 1878; formerly professor of renal diseases and clinical urology at the Hahnemann Medical College and Hospital; aged 85; died, October 19.

Earl Edgar Miller, Culbertson, Neb.; University of Nebraska College of Medicine, Omaha, 1924; aged 40; died, September 21, in St. Catherine's Hospital, McCook, of increased intracranial pressure.

Benjamin Garleaf Benson, Webster Groves, Mo.; St. Louis College of Physicians and Surgeons, 1888; served during the World War; aged 72; died, October 8, of coronary occlusion and arteriosclerosis.

Welland A. Peck, Scranton, Pa.; Medico-Chirurgical College of Philadelphia, 1899; member of the Medical Society of the State of Pennsylvania; aged 70; died, September 20, of acute endocarditis.

Albert Warren Stearns Jr., Billerica, Mass.; Tufts College Medical School, Boston, 1939; aged 25; died, September 5, in the Huntington Memorial Hospital, Boston, of Ewing's sarcoma of the left ileum.

Amelia Weickel, Perkasie, Pa.; Woman's Medical College of Pennsylvania, Philadelphia, 1904; aged 78; died, September 1, in the Grand View Hospital, Sellersville, of cerebral thrombosis and myocarditis.

William Henry Christian, Pittsburgh; Leonard Medical School, Raleigh, N. C., 1905; member of the Medical Society of the State of Pennsylvania; aged 61; died September 23, of aortic stenosis.

Joseph B. Cowen, Hamilton, Ohio; Medical College of Ohio, Cincinnati, 1897; aged 63; on the staffs of the Fort Hamilton Hospital and Mercy Hospital, where he died, October 2.

William M. Wilson ● Weaverville, Calif.; College of Medical Evangelists, Los Angeles, 1931; aged 40; died, September 10, of chronic nephritis, hypertension and cerebral hemorrhage.

Guy Ross Caley, Princeton, Minn.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1900; aged 63; died, September 26, of heart disease and chronic nephritis.

John William Adams, Waterville, Wash.; Jefferson Medical College of Philadelphia, 1887; formerly county health officer; aged 78; died, October 10, in a hospital at Wenatchee.

William Lamar Law, Prattville, Ala.; Tulane University of Louisiana School of Medicine, New Orleans, 1894; aged 68; died, October 13, in a hospital at Atlanta, Ga., of myocarditis.

John William Greer, Franklin, Tenn.; Memphis Hospital Medical College, 1899; member of the Tennessee State Medical Association; aged 69; died, October 16, of coronary thrombosis.

Ira A. Griffin, Snyder, Texas; Memphis (Tenn.) Hospital Medical College, 1908; member of the State Medical Association of Texas; aged 55; died, October 2, of cirrhosis of the liver.

Charles A. Haefner, Youngstown, Ohio; Central College of Physicians and Surgeons, Indianapolis, 1905; aged 64; died, October 10, in St. Elizabeth's Hospital of diabetes mellitus.

William D. Wilkinson, Boston; Middlesex College of Medicine and Surgery, Waltham, Mass., 1928; aged 40; was found dead, September 23, of a self-inflicted bullet wound.

Frederick Rutherford Warnock, Pembroke, Mass.; Columbia University College of Physicians and Surgeons, New York, 1937; aged 28; died, September 12, of appendicitis.

Carlyle Junius Edwards, Raleigh, N. C.; Medical College of Virginia, Richmond, 1917; member of the Medical Society of the State of North Carolina; aged 50; died, September 30.

Edwin Justus Haster, Dardanelle, Ark.; Kansas City (Mo.) College of Medicine and Surgery, 1924; member of the Arkansas Medical Society; aged 39; died, September 24.

Charles Gowen Buchanan Klophel, Ontario, Calif.; College of Physicians and Surgeons of Chicago, 1887; aged 72; died, September 17, of heart disease and arteriosclerosis.

William E. Jinkins, Charleston, Miss.; Louisville (Ky.) Medical College, 1887; at one time mayor of Eupora; formerly county health officer; aged 73; died, September 28.

Daniel E. Richards, San Diego, Calif.; Western Pennsylvania Medical College, Pittsburgh, 1894; aged 81; died, September 4, of arteriosclerosis and coronary occlusion.

Mark Johnson Williams, Oxford, Ala.; Birmingham Medical College, 1902; member of the Medical Association of the State of Alabama; aged 61; died, September 23.

Eugene Wolcott Whitney, La Mesa, Calif.; Rush Medical College, Chicago, 1878; past president of the Utah State Medical Association; aged 85; died, September 26.

Edward Gardner De Wolf, Somerville, Mass.; Dartmouth Medical School, Hanover, N. H., 1893; aged 70; died, September 29, in Worcester of bronchopneumonia.

John Albert Wilson ● New York; Columbia University College of Physicians and Surgeons, New York, 1917; aged 52; died, September 5, in Nantucket, Mass.

Harold Kirby, Minneapolis; University of the City of New York Medical Department, 1891; aged 71; died, September 23, in Louis Park, Minn., of sarcoma.

Rasmus Hansen Madsen, Palo Alto, Calif.; University of California Medical Department, San Francisco, 1901; died, September 22, in the Palo Alto Hospital.

Harvey Jason Hassard, Portage la Prairie, Man., Canada; Trinity Medical College, Toronto, Ont., 1901; aged 61; died, September 29, of coronary occlusion.

Willis J. Evans, Denver; Long Island College Hospital, Brooklyn, 1905; veteran of the Spanish-American War; aged 65; died, October 3, of myocarditis.

James Edward Childs, San Diego, Calif.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1889; aged 78; died, September 5.

Frank L. Harold, Richmond Ind.; Physio-Medical College of Indiana, Indianapolis, 1904; aged 60; died, October 14, of acute nephritis and enterocolitis.

Daniel Alfred Stubbs, Oxford, Pa.; Jefferson Medical College of Philadelphia, 1874; aged 87; died, September 25, in West Chester of pneumonia.

Frank Dudley McCulloch, Moose Jaw, Sask., Canada; McGill University Faculty of Medicine, Montreal, Que., 1925; aged 40; died, September 8.

Ernest Maxwell Fine, Crescent City, Calif.; Cooper Medical College, San Francisco, 1898; aged 66; died, September 30, of cerebral hemorrhage.

Bureau of Investigation

A. E. G. HALL

Alfred Ernest George Hall Again Reenters the United States and Becomes "Acquainted" with Another Better Business Bureau

A. E. G. Hall has twice previously been discussed in the columns of the Bureau of Investigation in THE JOURNAL. Both his penitentiary pictures and his fingerprints have been reproduced in our pages. The article which appeared in the issue of Oct. 13, 1928, called attention to the fact that Hall had encountered difficulty with the Rochester (N. Y.) Better Business Bureau and, after a heart-to-heart talk with Mr. F. M. Willson, the manager, canceled his remaining lectures and left the city.

The *Spotlight*, a publication of the Better Business Bureau of San Francisco, carried in its September 1939 issue a story under the heading "'Dr.' Alfred G. Hall, Famous Swindler, Nabbed in Marin County." This item reads as follows:

> "'Dr.' Alfred G. Hall, international swindler, pseudo-religious lecturer and promotor of the World Fellowship of Faith and Service, was apprehended in San Rafael on August 19 by Police Chief John B. Ruschetti, charged with illegal entry into the United States. The Better Business Bureau's tip to immigration authorities caused Hall's arrest.
>
> "Plans for a $100,000 university to be erected in Marin County were under way at the time Hall was nabbed. One follower presented the organization with a fifteen-acre site for the university. Others were urged to contribute finances for the enterprise. Hall officiated at a dedication ceremony a short time ago. Chief Ruschetti became suspicious when he observed Hall living with his followers in tents on the proposed site for the university.
>
> "Inquiries from persons who listened to 'Dr.' Hall's lectures at Western Women's Club, San Francisco, caused the Better Business Bureau to check his antecedents. It developed that he has a long record of promotions. At one time he was a self-appointed prison chaplain, but a few weeks later was lodged in the same jail where he had urged others to 'follow the straight and narrow path.'
>
> "An eventful career, marked by numerous arrests, was indicated by reports received from Better Business Bureaus throughout the United States and Canada. While he uses the title of 'Dr.,' it has not been substantiated that he has such a degree. In discourses on 'Sex and Civilization', he claimed to be a specialist from London, Paris, Geneva and Vienna. In Toronto, a newspaper described his sex lectures as 'utterly filthy and unscientific discourses on sexual subjects.'
>
> "At Richmond, Indiana, he created the 'American Academy of Psychological Research', modestly styled himself the 'Dean', and distributed degrees lavishly, the Bureau learned. In 1926, he created an organization to lecture against the use of narcotics, voting himself a satisfactory salary for his lectures. In Chicago, he operated a confidence game which brought him a sentence of six months in the House of Correction.
>
> "One of Hall's lectures in San Francisco was on the subject of 'Wandering or Going Straight.' Evidently he preferred, in his personal matters, to wander."

For purposes of reference, Hall's record, as far as the Bureau of Investigation had it at the time of an article published in THE JOURNAL, May 18, 1935, was as follows:

> **1923—Vancouver; arrested for obtaining credit under false pretenses. Sentence suspended.**
>
> **1924—Vancouver; arrested for conspiring to defraud. Case dismissed. Again arrested, charged with obtaining money under false pretenses and sentenced to six months at hard labor in Oakalla Prison.**
>
> **1925—Vancouver; arrested for obtaining money under false pretenses. Sentenced to twelve days. Again arrested for obtaining money under false pretenses and sent to jail.**
>
> **1926—Chicago; arrested on charge of operating a confidence game and obtaining money under false pretenses. Was fined and sentenced to six months in the House of Correction.**
>
> **1927—Chicago; arrested for practicing medicine without a license. Charge *nolle prossed* for lack of prosecution. At the same time Hall was taken into custody by the United States authorities as an alien who had violated the Immigration Act. He was given hearing and deported.**
>
> **1928—Toronto; arrested on the charge of vagrancy. Charge withdrawn, as he had money in his pocket.**
>
> **1930—Toronto; arrested for swindling the Royal York Hotel of about $1,100. Sentenced to six months in the Ontario Reformatory.**
>
> **1932—Cleveland; arrested by the police department and again deported to Canada.**
>
> **1933—Toronto; arrested and found guilty of theft. Sentenced to two years in the Kingston Penitentiary.**

The 1935 article detailed his escapade in Toronto in 1930, in which he ran a bill of $220 at the King Edward Hotel and, according to the Toronto papers, Hall persuaded the Royal York Hotel to put on a $1,000 banquet in connection with which he was later charged with obtaining credit by false pretenses. He had introduced himself as a doctor and general organizer of the National Order of Canada, which he claimed was paying him $12,000 a year and expenses. As a matter of fact, the Order had seventy-five members at that time, but Hall was not receiving any salary from it. He was convicted and sentenced to six months determinate and six months indeterminate in the Ontario Reformatory in May 1930. Said THE JOURNAL in 1935:

> "Not content with this sample of Ontario justice, Hall in 1933 was put on trial in Toronto on a charge of theft. Hall and one Fred Hastings, with whom he was associated, were alleged to have stolen $2,482 paid to them as subscriptions for various magazines and periodicals while they operated an organization known as the Dominion Publications Bureau. Hall acted as his own attorney, and in addressing the jury he said: 'You have not before you the ordinary type of criminal that goes out to plunder and steal.' He pleaded 'justification and honest error.' Hall told the jury, also, that he had written books about criminals, had looked after them spiritually, had studied them psychologically, and their actions were not the same as his own. He again charged that he was being hounded by the authorities. Hall was very persuasive and dragged the usual red-herrings across the trail, and the judge, in charging the jury, warned them not to allow themselves to be carried away 'by frenzied eloquence.' They did not. Hall was sentenced to two years in the Kingston Penitentiary.
>
> "A few weeks ago Hall completed his two-year sentence in the penitentiary. Apparently no sooner was he out of the penitentiary than he hired a hall, in accordance with his usual methods, and, as the Toronto *Evening Telegram* reported, 'smartly dressed in striped trousers, black coat, wing collar and flowing tie', addressed an audience—of less than a hundred—telling them what an unpleasant place the Kingston Penitentiary is. He also made charges against the warden of the penitentiary and the Hon. D. M. Ormond, Superintendent of Penitentiaries at Ottawa. Hall is reported to have stated to his audience that he didn't regret his experience in the penitentiary and that since getting out he had written a 100-page report. He claims to have been one of those sentenced to be paddled while he was in the penitentiary, but it appears from the report that, unfortunately for the public—and possibly for Hall himself—the sentence was not carried out."

This article concluded as follows: "The reason for calling attention to A. E. G. Hall is that this quack and ex-convict is more than likely to make another attempt to get into the United States. If he does, it can be taken for granted from his past record that he will live by his wits and at the expense of the American public."

Sooner or later Hall may catch on to the idea that he is not wanted in this country. Various protective organizations are doing their utmost to prevent his nefarious activities. Past experience, however, leads to the belief that he will spend the rest of his life playing true to form the role of psychologic quack that he has selected for himself.

MISBRANDED "PATENT MEDICINES"

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the United States Department of Agriculture

[EDITORIAL NOTE.—The abstracts that follow are given in the briefest possible form: (1) the name of the product; (2) the name of the manufacturer, shipper or consigner; (3) the composition; (4) the type of nostrum; (5) the reason for the charge of misbranding, and (6) the date of issuance of the Notice of Judgment—which is considerably later than the date of the seizure of the product and somewhat later than the conclusion of the case by the Food and Drug Administration.]

Carrocel.—Modern Health Products, Inc., Milwaukee. Composition: Essentially Lallemantia royleana (a mucilaginous substance) and a smaller amount of karaya gum. Fraudulently represented to be a health product and to correct colonic disorders.—[*N. J. 29765; March 1939.*]

Life (Miracle) Mineral Water.—Rocky Mountain Mineral Co., and George A. Manning (agent), Bessemer, Ala. Composition: Chiefly iron sulfate with small amo[illegible] of other mineral substances, not named. Fraudulently represented as a remedy for stomach troubles, arthritis, old sores, female complaints, blood diseases, etc.—[*N. J. 29753; March 1939.*]

Slim.—Modern Health Products, Inc., Milwaukee. Composition: Essentially senna (70 per cent), orange peel, anise, bladderwrack, buckthorn bark, dried apple, and centaury flowers. Fraudulently represented to normalize overweight, make the body slim and act as a health product.—[*N. J. 29765; March 1939.*]

Correspondence

THE PSYCHOLOGY OF THE BIRTH CONTROL CONTROVERSY

To the Editor:—In THE JOURNAL October 21 appears an article by Dr. George Kosmak with regard to birth control.

Dr. Kosmak refers to the "hysteria" of some one or other connected with the birth control movement: he refers to an "insane" approach and the "agitation" of many people. He refers to "loose thinking" and again to their "hysteria," to their "viciousness" and to their "inadequate reasoning."

Dr. Kosmak uses these psychiatric designations as if to contrast his own mental poise with the mental ill health of those with whom he doesn't agree. I am well acquainted with the persons who are chiefly responsible for having brought the problem of birth control to the more serious attention of our profession and of the public generally, and in my capacity as a psychiatrist I must offer the opinion that no signs of hysteria, insanity, viciousness or agitation have made their appearance. On the contrary, I should say that far more quiet, intelligent reflection and far less emotion have been manifested by them than by Dr. Kosmak in his somewhat excited diatribe against them.

Dr. Kosmak is entirely correct in saying that the question deserves scientific study, and this is precisely what the non-professional advocates of birth control have sought. There is nothing to prevent Dr. Kosmak's doing this without denouncing those earnest and honest individuals, all of them friends of the medical profession, who have brought this problem out of the realm of prudish and bigoted suppression to the point where the scientific intelligence of Dr. Kosmak and others can be applied to its solution.

KARL MENNINGER, M.D., Topeka, Kan.

[Dr. Menninger's letter was submitted to Dr. Kosmak, who replied as follows:]

To the Editor:—I had fully expected reactions to my paper such as those enunciated by Dr. Menninger. Notwithstanding his doubts about my designation of certain groups of "birth control" enthusiasts as hysterical and given to exaggeration and loose thinking, I feel that my judgment of their activities will be generally endorsed by many fair minded members of the profession as well as by laymen who can trace the connection between their propaganda and the widespread results of the desire for avoiding pregnancy under all circumstances. In this connection one might also refer to the disgusting commercial exploitation of contraceptive devices which is encountered on every hand and which may be regarded as a response to the public dissemination of the literature and utterances of propagandist groups. One cannot question the sincerity of the rational advocates of birth control for medical and, perhaps, limited social indications, but my particular condemnation applies to the more radical groups who have fathered the extensive newspaper, magazine and other publicity with which a perfectly legitimate movement has been surrounded and which has worked to its detriment. The terms which I employed in my paper to designate those activities would be applicable in common parlance, although they may not agree with the more scientific (?) diagnostic designations of the psychiatrist. In view of the many commendatory letters received, my views evidently met the approval of those less hampered by such academic distinctions.

As for any expressions of friendliness toward the medical profession from certain advocates of the unrestrained dissemination of birth control information as claimed by Dr. Menninger, this has been developed, in my opinion, largely as a matter of expediency only in more recent years.

A careful reading of my paper would have disclosed to Dr. Menninger that I made no accusations whatever against those earnest and sincere persons who have approached the problem as a health or social measure in a purely professional sense. But these are not the people to whom I refer, and one need not seek very far to learn the identity of the others.

Physicians as a class must be accused of indifference and laxity in their attitude toward the important questions involved in the subject of what is popularly but erroneously designated as "birth control." If they can be stimulated to assume their responsibilities in the matter, this would prove a satisfactory ending to the discussion and constitute a sufficient reason for the attention which my own small effort may have generated.

GEORGE W. KOSMAK, M.D., New York.

REDUCTION OF MOTOR ACCIDENTS

To the Editor:—The most serious medical problem in the United States today is the motor accident. A special committee should study this problem from all angles, such as (1) road construction, (2) proper universal marking of roads, (3) car construction, (4) education of the public, and (5) proper medical care.

As coroner of a small county of 80,000 population, I have tried to reason "the why of accidents" in this locality. Contrary to most people's belief, alcohol and too fast driving are not the chief causes. The usual cause is lack of proper judgment on the part of the driver. Judgment depends on the condition of the driver, the condition of the road, road markings, construction of the car, the weather and an estimate of the speed of an approaching car.

In the fatal accidents of this county I have noted the part of the car that I thought responsible for the accident. If all coroners would report such observations to an American Medical Association committee, I believe that, through recommendations, the automobile death toll in the future might be reduced in place of gradually rising higher and higher.

The following suggestions are based on my personal study of accidents resulting in death in Linn County, Iowa, during the past four years.

Compulsory Driver's Test After an Accident.—The driver in an accident case should be compelled to take a driver's test. The committee might advise all states to frame a law making it compulsory for any driver involved in an accident to take another driver's test before driving a car again. Those failing to pass should be refused a new license until the defect in the car is corrected or the driver's abnormality is properly remedied.

Road Markings.—Knowing that many drivers have defective vision—not properly corrected—and that persons with good vision often cannot read letters of 6 inches through dirty windshields off the side of the road when traveling in a car at 40 miles an hour, I suggest that the signs for traffic safety should be on the pavement, directly in the lane of best vision. No fatal accident, which any sign could prevent, happens when snow covers the pavement, the only objection to "on pavement" signs.

Safer Car Construction.—Desiring more safety for myself and family I shall herewith order the first 1941 popular priced car (any make) constructed according to the following safety ideas.

1. Bumper All Around: A bumper running entirely around the car (removable section to change tires). In most fatal

accidents the bumper of one car catches into the front or rear wheels of the other car and both turn over, or the end of the front bumper is pushed into the front wheel and the car darts off the road.

2. Turtle or Helmet-Shaped Body: Artists have streamlined the tops of cars, but the bottom still has protruding fenders and door handles. The body should be brought out to the bumper on the sides at the bottom so that the fenders are entirely beneath the body. The running board—if any—should also be covered by the body of the car. Door handles should be hinged and dropped into a well in the door.

3. Knock Out Windshield: With safety glass in the windshield, the doctor now sees severe head and neck injuries. The windshield should be so designed that a force of 50 pounds from the inside would loosen the entire windshield without breaking it.

Other desirable features are the steering wheel constructed of material that will bend but not break. There should be no sharp corners on the instrument panel. A strong support should be placed behind the engine to keep the engine from being pushed back against the front seat in case of collision. There should be no sharp ornaments near the front of the car.

B. L. KNIGHT, M.D., Cedar Rapids, Iowa.
Coroner of Linn County.

THE ERYTHROCYTE SEDIMENTATION TEST

To the Editor:—In a recent issue of THE JOURNAL (September 2, p. 942) appeared an editorial on the technic of the erythrocyte sedimentation test. In this editorial an article by Hambleton and Christianson (*Am. J. M. Sc.* **198**:177 [Aug.] 1939) was cited in which the authors concluded that the "most commonly used sedimentation technic, without involving complicated corrective procedures, is the most valuable for clinical purposes." The editorial closes with the remark that "this furnishes welcome news to the vast majority of those using the blood sedimentation test in their office and hospital work."

Of course, any report which purports to simplify the technic of a laboratory procedure to such an extent that the general practitioner can carry out the test in his office is welcome news to him and also to the technicians who must do the test. Unfortunately, in most cases the so-called simplification entails the omission of vital steps in the procedure, and this seriously detracts from the reliability of the results. In the case of the apparently simple sedimentation test there are many factors which must be taken into account if results worth the effort are to be obtained.

In an article on the sedimentation rate of erythrocytes, Ham and Curtis (*Medicine* **17**:447 [Dec.] 1938) have indicated some of the technical factors responsible for variations in the results obtained in tests made on a single specimen of blood, based on a review of the literature and careful experiments carried out by themselves. The following are some of the points in the technic which affect the sedimentation rate: 1. The rate has been found to be more rapid at higher temperatures. 2. If the tube is inclined away from the vertical, the rate is considerably increased. 3. Other things being equal, the sedimentation rate is higher for lower concentrations of the erythrocytes.

For an understanding of the significance of the results of sedimentation tests, it is essential to know on what properties of the blood the rate of sedimentation depends. It is obvious that the greater the difference in specific gravity between the red cells and the plasma, the more rapidly will the cells settle. On the other hand the higher the viscosity of the plasma, the more delayed will be the sedimentation of the cells. Finally, since the larger the size of the particles settling in a medium the more rapidly does sedimentation occur, if the red cells are clumped in rouleaux the rate will be increased.

It is evident that an increased sedimentation rate need not in every case signify the presence of an infection or a proteolytic process, nor does the rate depend on a single specific substance in the blood, although it has been shown that a definite correlation exists between the rate and the fibrinogen content of the plasma. For example, the ingestion of large amounts of water would decrease the specific gravity of the plasma and also its viscosity, and in that way might give rise to an increased sedimentation rate. In this connection a report by Ride, Ling, Lim and Cheng (*Caduceus* **17**:175 [Nov.] 1938) on the sedimentation rate in cholera is of interest. These authors observed that during the acute stage of the disease, on account of the large loss of water through the bowels, the viscosity of the blood is so greatly increased that the sedimentation rate is considerably reduced. When the patient begins to recover, the normal viscosity of the blood is restored and the rate is increased. Therefore in this disease one has the reverse of the usual state of affairs: the rate increases instead of decreasing as the patient improves.

With regard to the technical aspects, it is essential that care be taken to place the sedimentation tube in a perfectly vertical position and that all tests be carried out at the same temperature. With regard to the importance of the latter precaution I shall cite some unpublished experiments carried out with Barbara Fisk and Claire Edelman. Tests were made on a series of healthy blood donors by the technic of Wintrobe and Landsberg. The tests were set up in duplicate, one set at room temperature (in our experiments this varied between 68 and 73 F.) and the other at body temperature (98 F.). It was found that in practically every case the rate at body temperature was about two and one-half times as high as the rate at room temperature. For example, when the rate at room temperature was 2 mm./hour, the rate at body temperature was 5 mm./hour, and in another case in which the rate at room temperature was 16 mm./hour the rate at body temperature was 37 mm./hour. On the other hand, in the refrigerator the rate is considerably less than at room temperature. While under ordinary conditions room temperature should not vary greatly, on hot summer days or in warm climates it is necessary to make allowance for the effect of temperature on the test.

With respect to the importance of the erythrocyte concentration, Ham and Curtis point out that the red blood cells in settling displace the plasma, causing a current in an upward direction, and this in turn retards the sedimentation of the cells. The higher the concentration of red cells the more pronounced is this reverse current. To illustrate this I shall describe one of a series of experiments carried out by me with Fisk and Edelman. A blood with a hematocrit of 0.50, having a sedimentation rate at room temperature of 4 mm./hour, was centrifuged and the plasma and cells were separated. Then only enough cells were resuspended in the patient's plasma to give a hematocrit of 0.32. The sedimentation rate under these conditions was 34 mm./hour. In anemias the concentration of red blood cells is low, and, since in addition in severe anemias the viscosity of the plasma is usually decreased, there would be two factors militating to increase the sedimentation rate even in the absence of any additional pathologic condition. Therefore, if no correction is made for erythrocyte concentration, the results of the sedimentation test are apt to be misinterpreted.

A. S. WIENER, M.D., Brooklyn.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

LATENT SYPHILIS—HEMATURIA IN SYPHILITIC PATIENT

To the Editor:—A man with syphilis still has a 4 plus reaction to Kahn, Kline and Wassermann tests after a year's regular treatment. For the past five months there has been a hematuria with from 2 to 30 cells per high power field. He is a railroad worker, aged 35, of excellent general appearance, a weight of 186 pounds (84 Kg.) and a height of 5 feet and 10 inches (178 cm.). There is no history of the time of the original infection. He has no children, and his wife has had three negative Wassermann reactions and three physical examinations with negative results since he has been under treatment. Wassermann, Kahn and Kline reactions were 4 plus on Oct. 27, 1938, of which time his only complaint was "canker sores" in his mouth. No dark field examination was made. He received a half dose, 0.3 Gm., of neoarsphenamine (first dose) intravenously, followed by 0.3 Gm. and 0.45 Gm. of neoarsphenamine in weekly injections for a total of eighteen doses. During the same period he has received 0.2 Gm. of bismuth subsalicylate once a week for a total of seventeen doses. Since then he has received a weekly injection of neoarsphenamine or bismuth five of which times his only complaint was "canker sores" in his mouth. No dark field examination was made. He received a half dose, 0.3 Gm., of neoarsphenamine (first dose) intravenously, followed by 0.3 Gm. and 0.45 Gm. of neoarsphenamine in weekly injections for a total of eighteen doses. During the same period he has received 0.2 Gm. of bismuth subsalicylate once a week for a total of seventeen doses. Since then he has received a weekly injection of neoarsphenamine or bismuth five of which times and then five of bismuth) since the hematuria was discovered. To date he has had a total of thirty-two neoarsphenamine and thirty-four bismuth injections in eleven months of treatment. At about the time of the fifth neoarsphenamine injection he became violently ill several hours after his treatment, with chills, vomiting and headache. Previously he had had no reaction whatever except that one injection of neoarsphenamine had been accompanied by local irritation. The three violent reactions did not occur chronologically. Sterilization of instruments, qualities of supplies and dietary control, before and after the neoarsphenamine had been given, were carefully checked, and I felt were not the cause of his reactions. About February, after he had received fifteen neoarsphenamine injections, there appeared a small series of painless moist ulcers about the size of a match head at the circumcised edge of the penis. These disappeared with the use of a dusting powder made with a mercury base. No dark field study was made. There has been no recurrence of any lesions of the mucous membrane. There has been not even a mild reaction with the rest of his intravenous therapy. He has gained about 30 pounds (14 Kg.), looks well and has never felt better in his life. Blood pressure has been and is normal (125 systolic and 75 diastolic). A flat roentgenogram of his abdomen shows no stones of the kidney, ureter or bladder. Hematuria was first observed after about twenty-five neoarsphenamine and bismuth injections. At that time he had a bilateral backache in the kidney region. He had from 10 to 20 pus cells in the first specimen with a 3 plus reaction for blood. He gave a history of a recent head cold, accompanied by severe backache. I do not know whether this preceding respiratory infection had any connection. At any rate he was cut down to one injection a week, in series of five. We were unable to discover any increase or decrease in hematuria following the bismuth or the neoarsphenamine interval. I am unable to decide, because of the hematuria and the remaining 4 plus Wassermann reactions, what I can best do for him. I have not made a spinal fluid Wassermann test but planned to do so before discharging him. He understood from the start that he would probably need treatment for one to one and a half years. I should greatly appreciate counsel as to further treatment of this man. In a recent series of 300 Wassermann tests on employees of an industrial plant, I found among those with positive reactions about six with 4 plus Wassermann, Kahn and Kline reactions who had had previous treatment to the point of becoming Wassermann negative—some as long as twelve years ago. They were all symptom free on careful physical examination. I acknowledge the need for individualization, but what general program would you start with and how long would you treat them after their Wassermann reactions are negative again?

M.D., Indiana.

ANSWER.—This question resolves itself into three parts: first, the management of syphilis in the patient in question; second, the hematuria of the patient, and third, the general treatment of patients with latent syphilis who were seronegative as a result of previous treatment but are now seropositive.

1. No definite conclusions can be reached as to the stage of syphilis in the patient described. The supposed "canker sores" in the mouth in October 1938 and the penile lesions in February 1939 might conceivably have been early and treatment-resistant syphilis, though this cannot now be proved since no dark field examinations were made. On the other hand, it is much more likely that the "canker sores" represented an ordinary aphthous stomatitis and the penile lesions herpes progenitalis and that they are therefore of no value in dating the infection in the patient. The fact that the wife is normal suggests that the patient had syphilis at least five years before his marriage to her, the date of which is not given. His physical examination is not completely described, though the inquirer apparently assumes that the syphilitic infection is latent.

No opinion whatever can be expressed as to the adequacy of treatment given so far or as to the type of treatment still to be given until the patient's spinal fluid is examined. The inquirer states "I have not done a spinal fluid Wassermann test but planned to do so before discharging him." It cannot be too frequently emphasized that in the treatment of patients with late syphilis of any type—latent or otherwise—the spinal fluid should be examined early, not late, and if possible at the start of treatment. If the spinal fluid reaction is positive, treatment is usually of a different type and always of a different intensity than if the spinal fluid is normal. It goes without saying, moreover, that a spinal fluid Wassermann test is not adequate and that a proper examination of the spinal fluid includes cell count, quantitative protein estimation, quantitatively titered Wassermann test with amounts ranging from 0.1 to 1.0 cc., and a colloidal test, gold, mastic or benzoin.

It is immediately necessary therefore to test the spinal fluid. If this is normal and if the results of careful physical examination with particular reference to the central nervous system and cardiovascular apparatus, plus results of fluoroscopic and teleoroentgenographic examination of the cardiovascular stripe (the latter including the left anterior oblique position) are normal, it may be assumed that the patient has now had enough treatment for syphilis and this may be stopped, regardless of his positive serologic reactions. If, on the other hand, the spinal fluid is abnormal or if physical and x-ray examination show abnormalities in the nervous system or cardiovascular system, further treatment is indicated, but its type and amount cannot be determined without more information than is supplied.

2. Much more important at the moment than the patient's syphilitic infection is the hematuria, the cause of which is by no means clear on the basis of the information provided. It may be safely assumed that this is not due to syphilis and that it is almost surely not due to antisyphilitic treatment. The head cold accompanied by backache immediately preceding the discovery of hematuria suggests that the latter may be due to an acute glomerular nephritis or an acute or subacute pyelonephritis. The investigation of the hematuria is, however, hardly complete with a flat plate of the abdomen only. Is there any edema? What are the results of renal function tests? Does intravenous pyelographic study show any abnormalities? If no other cause for the bleeding can be discovered cystoscopic and retrograde pyelographic examination should be carried out in order to determine its cause.

The importance of definition of the cause of the hematuria is so great as to suggest that temporarily, and regardless of the outcome of spinal fluid examination, treatment for syphilis should be suspended until the complicating disease is more accurately defined.

3. The third question deals with the general problem of the management of patients with latent syphilis treated to the point of seronegativity but later, after years of subsequent observation, showing positive serologic reactions of the blood. The question is based on the prevalent custom of treating patients with latent and late syphilis on the basis of serologic data. The successful treatment of latent syphilis at the time of the original diagnosis does not depend on reversal of the serologic reaction to negative but depends instead on the administration of an arbitrary amount of treatment determined by the clinical outcome in large series of patients followed over long periods. One needs closely to keep in mind the purpose of treatment of latent syphilis, which is not the treatment of a blood reaction but instead treatment administered prophylactically to prevent the development of disease as opposed to laboratory evidence of infection. On the basis of present knowledge, eighteen months of continuous antisyphilitic treatment is adequate for the patient whose syphilis of more than four years' duration is genuinely latent. Whether or not treatment should be terminated at this point or carried further has nothing whatever to do with the outcome of the blood test. Whether or not it should be subsequently resumed depends not on the outcome of the qualitative serologic test per se, but instead, and this is much more important, on the basis of the possible development of clinical evidence of disease or on a high titer serologic relapse as evidenced by repeated quantitative blood tests.

In the particular circumstance described here a patient treated twelve years ago then became seronegative and is now found to be seropositive. This circumstance almost surely depends not on any change in the patient himself but instead on increased sensitivity of the serologic tests employed now as contrasted to those employed twelve years ago. The question then becomes: Shall one resume treatment on this patient because laboratories now are better than they were twelve years ago? This question answers itself by virtue of its own absurdity.

In other words, if the six patients mentioned in the inquirer's last paragraph were adequately treated for latent syphilis some years ago; if they now show no physical evidence of disease, and if results of their spinal fluid examinations are all normal, it may be inadvisable to give any treatment. It is, however, advisable to continue to perform blood tests at periodic intervals by a quantitative technic. If the reagin titer in the blood of these patients is rising, the desirability for treatment may again become apparent.

Parenthetically, this is the only present known use for quantitative titration of serologic tests, namely, for the follow-up study of patients who have been placed on probation.

INFLUENZA IN HORSES AND MAN

To the Editor:—A man states that he bought a horse which had influenza (or shipping fever) and that he contracted influenza from this horse. Will you kindly let me know whether the "flu" is communicable from horse to man? If there is any literature regarding this subject I would appreciate it if you would refer me to it.

S. H. Anderson, M.D., Red Wing, Minn.

ANSWER.—The impression that equine influenza is related to influenza in man is old. Numerous writers have called attention to the synchronous relationship of influenza in horses and epidemics of influenza in the human population. According to A. J. Williams (Analogies Between Influenza of Horses and Influenza of Man, *Proc. Roy. Soc. Med.* **17**:47 [June] 1924) there has been no convincing evidence that the equine disease is transmitted to handlers, and in the equine epidemic of 1872-1873 there was no increased amount of influenza in man. Equine influenza has not been thoroughly placed on an etiologic basis, although hemolytic streptococci have been found in abundance in most outbreaks. Waldmann has studied the epidemic cough of horses which resembles what is called equine influenza and has reported the isolation of a filtrable virus which combines with hemolytic streptococci to produce a severe form of the disease. There is no evidence that this virus bears any relation to human influenza virus.

It would appear that much of the answer to this question depends on whether the correctness of the diagnosis of horse influenza is important. Other equine diseases, such as encephalomyelitis, do attack human individuals.

POSSIBLE TULAREMIA AFTER CATFISH PRICK

To the Editor:—On May 31, 1939, a 16 year old boy came to my office with the complaint "I was stuck by a catfish yesterday and today I feel terrible and my arm hurts." Further questioning revealed that it was the ordinary type of catfish and that the patient was having sharp shooting pains through the right arm and shoulder. He had been feeling well prior to the accident. The past and family histories were essentially irrelevant. The temperature was 101 F., the pulse rate 100 and the respiratory rate 22. There was an area of redness about the size of a half dollar over the right costoclavicular junction. The axillary glands were palpable or tender. The remainder of the physical examination gave essentially negative results. He was given symptomatic treatment, i. e., powder of ipecac and opium to induce diaphoresis, forced fluids, bed rest, and hot packs to the site of puncture. On July 10 he received a dirty puncture wound on the sole of the left foot and was given 1,500 units of antitetanus serum in the left deltoid. At this time he was still complaining of slight pain in the right shoulder. On August 23 he returned because of difficulty in using the right arm, particularly in abduction. A small foreign body discovered over the right costoclavicular junction was extracted and found to be a sharp bony spine about one-fourth inch long. He was referred to an orthopedist and on September 13 I received the following report: "The right shoulder shows moderate atrophy of the supraspinatus and infraspinatus muscles. There is marked weakness of the serratus magnus with winging of the scapula. The right shoulder is lower than the left. The deltoid, biceps and pectorals are not involved." I should appreciate having the following questions answered: Is any catfish toxin known which might have produced this result? Is it possible that this boy was inoculated with poliomyelitis virus on being "horned" by a catfish? Could the antitetanus serum possibly have had any such effect? (The skin test was negative and he had mild serum reaction about a week later for which he did not report back.) What treatment would you recommend?

M.D., Ohio.

ANSWER.—Catfish in certain sections of the country have become contaminated with Bacterium tularense. One specific case of human infection from the prick of a catfish fin has been reported by D. H. Miller in Wichita, Kan. In this case the fish was caught in the Neosho River, Morris County, Kan. Miller learned that at least three other persons, after being pricked by fins of fish of the same catch, developed a disease similar to that of his patient, which was proved to be tularemia. He was further able to obtain reports that rabbits with so-called rabbit fever had been seen to fall into the river and drown and that the river water contained numerous rabbit carcasses.

Although in the case reported in this query there was an extremely short incubation period, since the patient stated that the injury from the catfish occurred on the day preceding his application for medical attention, the temperature, pulse and area of redness in the region of the shoulder are quite compatible with a Bacterium tularense ascending infection from the catfish injury. Infection which may have localized in the right costoclavicular junction may well have resulted in considerable atrophy from disuse of the shoulder.

No evidence has been found which would justify any assumption that there is a catfish toxin. It is equally unlikely that the antitetanus serum produced the disability. The course of the illness, as described, is not compatible with a diagnosis of anterior poliomyelitis and there have been no cases reported in which the inoculation with poliomyelitis virus occurred in any manner similar to this. It would be well to have a serum agglutination test for tularemia, since this test continues positive for a long time after the infection itself has subsided. If tularemia cannot be proved and the diagnosis of paresis of the serratus magnus with winging of the scapula is correct, this arm should be splinted in a position of 90 degrees abduction at the shoulder and 45 degrees external rotation. This airplane type of splint should be continued for not less than three months, with the patient receiving physical therapy consisting of light, heat and light massage two or three times a week, if this type of treatment is available. Exercises for the weak muscles should be carefully supervised and should not be started until from four to six weeks after applying the splint.

SLOW FETAL HEART RATE

To the Editor:—What explanation would you give for a slow heart in this case? The rate of fetal heart tones at every examination was 76 a minute with an occasional dropped beat. The tones were loud. One hour after birth the tones were regular and of good quality and the rate was 78; since then it has been 80. Once during sleep it was 66 a minute. The baby is developing normally and is breast fed. Physicial examination does not reveal anything wrong with the heart as to size or murmurs. The mother's heart rate during pregnancy and now is 78 to 80. She had an attack of cardiac angina of the seventh month that required morphine, and there is a history of an attack one year ago. Can you have an opinion on such limited information? Has any case of such a low pulse in a fetus or newborn infant been reported?

W. I. Devers, M.D., Pierce, Neb.

ANSWER.—A fetal heart rate of 80 or less is rare late in pregnancy. It is quite common to find a temporary slowing of the heart beat as a result of some interference with the fetal circulation, but as a rule the rate returns to normal in a period of hours. To have such a condition persist after delivery of the baby is extremely rare. In a maternity service which has delivered well over 50,000 babies there is no accurate record of such a case. One must assume that there is some congenital anomaly involving the sino-auricular node similar to the condition which is responsible for heart block in the adult. Cardiac congenital malformations are not rare, although this particular abnormality is unusual. The baby should be studied carefully if possible by means of the electrocardiograph. In the event that no unusual organic pathologic condition can be determined no therapy is indicated.

PHYSIOLOGY OF TICKLING

To the Editor:—Why is it that the vast majority of people are sensitive to tickling, especially in the axillae, when the tickling is done by a second party, yet are completely unaffected when they do it to themselves? Can the explanation be purely psychologic? What is the physiology of tickling of the skin and the common nervous effect?

M.D., Saskatchewan.

ANSWER.—Most people have what is known as a deep tickling reflex, which is brought about by peripheral stimuli not self induced and results in laughter. It is elicited by stimulation of the end organs of certain large tendons or aponeuroses, or of the periosteum of certain bones, especially the ribs. The areas in which such pressure produces laughter are the lateral walls of the thorax, axillae, abdomen and iliac fossae. This pressure must be done usually by another individual and it induces a tonic contraction of the neighboring muscles together with a withdrawal from the stimulus and laughter. At times weeping may occur. The fact that laughter usually does not occur when the stimulation is self induced is due to two factors. One is that the individual is not prepared to laugh (conscious inhibition) and the other is that there is no decrease in the tone of the involved musculature that is being stimulated. Certainly laughter temporarily diminishes the tonus of all the voluntary muscles. It is entirely possible to overcome the effects of the deep tickling reflex by keeping the involved areas completely rigid. The pathway of the deep tickling reflex is peripheral nerve, posterior horn, posterior column and ascending tracts to the thalamus. There is also a superficial or cutaneous tickling or itching effect. This effect is a cutaneous sensation elicited either by the individual himself or by an outsider. It is pro-

duced by touching with a feather, moving the hairs, and the like. This sensation may continue for some little time after the stimulus has ceased and it can be relieved by vigorous rubbing or scratching of the involved part.

BRAKE FLUID AND TIRE POWDER

To the Editor:—Have you any information as to the composition and possible irritant qualities on the skin of the modern brake fluid used in automobiles? I understand that contact is sometimes irritating. Also is the powder used on new tires irritating to some skins?

Stanley Crawford, M.D., Pittsburgh.

Answer.—The composition of brake fluids is secret with automobile manufacturers and varies with the different makes of automobiles. Many contain esters of fatty acids, tetrahydrofurfuryl alcohol and other constituents which might be expected to produce dermatitis in susceptible individuals.

The powder used on new tires is usually composed of talc or soapstone and should not be a chemical irritant to the skin. However, if the powder is not finely ground there may be some sharp crystals remaining in it which may penetrate the skin and cause dermatitis. Whiting, which consists principally of calcium carbonate and a slight amount of silica and the oxides of iron and aluminum, is used extensively as a filler for rubber products and may bloom out of the rubber in the form of a powder. This should not irritate the skin. However, irritant materials such as antioxidants and accelerators may also bloom out of the rubber, and these substances will cause dermatitis in sensitive individuals. A chemical analysis of the powder on the rubber is necessary to determine whether it is soapstone put on to prevent the rubber from sticking or whether it is a "bloom." For further information on rubber and blooms the inquirer is referred to Skin Hazards in American Industry (Public Health Bulletin 215, part 1, pp. 1-10).

MYXEDEMA AND COLD EXTREMITIES

To the Editor:—A 70 year old multipara passed the menopause at 45. At 50 she was treated for myxedema because of increasing weight and a generalized cold feeling. The basal metabolic rate was extremely low. She took thyroid and corpus luteum by mouth for twenty years with benefit. In December 1938 she developed intermittent attacks of cold feet and legs with numbness of some of her toes. No ischemia or cyanosis was present. Now she has periods of extreme coldness of one or the other lower extremity, alternating with a sensation of heat in the same places. There may be places as large as two hands in various parts of the body, usually in the extremities, which will be extremely cold. Even during the hottest nights she sleeps at times with her feet wrapped in blankets and with hot water bottles applied. Frequently her whole torso will sweat profusely when her extremities are cold. At times she is symptom free for short periods. Attacks of cold in the extremities may last two days. Attacks of heat in the extremities usually are of less than one day's duration. Except for a metabolic rate of —27, the examination of this patient is essentially negative. The blood pressure is 130 systolic and 80 diastolic; the urine, temperature, and blood count, reflexes and tactile sense are normal except for intermittent numbness of the great and adjacent toes of both feet. There seems to be adequate peripheral circulation as expressed by normal pulsating dorsalis pedis arteries. Can you suggest a diagnosis or means of arriving at one? Can you suggest treatment?

M.D., Texas.

Answer.—A patient with myxedema can scarcely be considered to have adequate treatment with a basal metabolic rate of —27 per cent. The first step in solving the problem is to raise the metabolism gradually to normal by slowly increasing the dose of thyroid. A word of caution is necessary because the patient is 70 years old and, therefore, more likely to have disease of her coronary arteries than younger patients. The dose should not be increased more than ½ grain (0.03 Gm. U. S. P. thyroid) at a time and increases should not be made more often than once in six weeks.

INTRAVENOUS PARALDEHYDE

To the Editor:—Have you any information on the intravenous administration of paraldehyde? A friend of mine is using it in 2 to 3 cc. doses and believes it to be safe and effective in acute alcoholic intoxication.

M.D., California.

Answer.—The intravenous injection of from 2 to 3 cc. of paraldehyde would be entirely safe from the standpoint of dosage: Nitzescu and Iacobovici (*Presse méd.* **42**:331 [Feb. 28] 1934) reported the use of from 0.15 to 0.21 cc. paraldehyde per kilogram of body weight by intravenous injection for the production of general anesthesia, and this would amount to from 10 to 15 cc. for an adult of 70 Kg. The only question concerns flocculation of the blood and consequent flocculation shock. They employed a 6 to 8 per cent solution of paraldehyde in 5.66 per cent of dextrose, injected at the rate of from 15 to 20 cc. a minute. This solution gives a distinct opacity if shaken with an equal volume of protein solution (egg white diluted with 10 parts of water). However, the opalescence is slight and would probably not give trouble if the injection was made slowly. Paraldehyde requires 8 parts of water for solution, and if undiluted paraldehyde is shaken with an equal volume of the protein solution there is immediate precipitation. It would seem therefore that there is risk of serious flocculation shock if undiluted paraldehyde is injected into a vein, even if this is done slowly. Rectal injection of equal volumes of paraldehyde and olive oil, or of a 10 per cent solution in physiologic solution of sodium chloride, gives prompt sedation and would seem preferable to the intravenous injection.

DISCHARGING BREASTS

To the Editor:—A woman aged 26 has late latent syphilis with intermittent therapy. She suddenly developed a thin greenish discharge, which exudes and can readily be expressed from her nipples. Her mammary glands have also become enlarged within the last few months. An increase of 14 pounds (6.4 Kg.) in weight since May is also apparent, as is a sluggishness of her activity. The basal metabolic rate has not been determined. There has been oligomenorrhea and irregularity of the menses for the past three months. Erythema has been noticed over the hypothenar eminences of the palmar aspect of the hands. Approximately one and one-half years ago I performed an oophorectomy (unilateral), salpingectomy (bilateral) and appendectomy on this patient. She made an uneventful recovery. I realize that the syphilitic infection should be cured for. The other symptoms point to an endocrine imbalance, probably on an ovarian basis. The remaining ovary has undoubtedly failed because of vascular insufficiency (development of adhesions) or cystic degeneration as a result of the past gonorrheal infection for which the pelvic operation was done. Do you agree that the greenish discharge is of endocrine origin? M.D., Illinois.

Answer.—The secretion from the breasts may have an endocrine basis, but a microscopic examination should be made to be certain that the secretion does not contain blood. It is assumed that physical examination of the breasts revealed no abnormalities. The patient should have at least one basal metabolic test. Because of the recent sudden gain in weight, the patient should be placed on a reducing diet and should be given a small amount of thyroid even if the basal metabolic rate is normal, but certainly if it is lower than normal. Likewise, thorough and persistent antisyphilitic therapy should be instituted. The remaining ovary may not function properly because its circulation was interfered with mechanically by the operation rather than by adhesions and the gonorrheal infection. A bimanual examination should be made to rule out a pelvic disturbance, which occasionally is associated with a discharge from the breasts.

ELECTRIC OPHTHALMIA

To the Editor:—What is the best treatment for the extremely painful irritation of the eye caused by exposure to the glare of an electric welding torch? I have seen a number of cases lately and was usually forced to use morphine injections when local application of epinephrine and phenacaine hydrochloride, ice pack and avoidance of light were not satisfactory.

F. C. Katzenstein, M.D., Salem, Ill.

Answer.—The condition known as electric ophthalmia, snow blindness or Klieg eye consists of a superficial injury to the corneal epithelium by ultraviolet rays of less than 3,300 angstroms. The superficial nerve terminals of the cornea are exposed by the death and desiccation of superficial epithelium and consequently the pain will persist until the epithelium has regenerated. Complete tight bandaging of both eyes and the local use of anesthetics usually suffices to control the pain, but, as the writer says, the use of morphine is at times necessary. That procedure is not contraindicated.

TERMITE SPRAY AND ORTHODICHLOROBENZENE

To the Editor:—Can you give me any information as to what is used in the commercial spray for termites and also as to any effects reported on the eyes of those employed in its use.

S. M. Gates, M.D., Monticello, Ark.

Answer.—Orthodichlorobenzene is probably the agent in question. In connection with its use in combating termites the following statement appears in "Injury to Buildings by Termites" (United States Department of Agriculture, leaflet 101, June 1936). "The cautions to be observed in the use of this chemical are not to let it come in contact with the face and hands, as it burns slightly, and it is distinctly painful if it gets into the eyes. In applying it to a closed space beneath the building, the operator should not remain too long subject to the fumes, and it is desirable to secure as good ventilation as possible while applying the chemical."

For further and more detailed information concerning this chemical, reference might be made to "Dermatitis from Orthodichlorobenzene" (Queries and Minor Notes, The Journal, September 9, p. 1053).

Medical Examinations and Licensure

COMING EXAMINATIONS

STATE AND TERRITORIAL BOARDS

Examinations of state and territorial boards were published in THE JOURNAL, November 25, page 1985.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Parts I and II. Medical centers having five or more candidates desiring to take the examination, Feb. 12-14. Part III. Chicago, Jan. 16-18. New York, January 15-17. Registration closes Dec. 9. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th Street, Philadelphia.

SPECIAL BOARDS

AMERICAN BOARD OF ANESTHESIOLOGY: An Affiliate of the American Board of Surgery. *Written.* Part I. Various places throughout the United States and Canada, March 28. *Oral.* Part II. New York, June 10-11. Applications must be received 60 days prior to examination. Sec., Dr. Paul M. Wood 745 Fifth Ave., New York.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: November 1940. *If a sufficient number of applications are received before March 1, there will be an examination at New York, June 10-14.* Sec., Dr. C. Guy Lane, Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written.* Various sections of the United States, Feb. 19. Formal application must be received on or before Jan. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *General oral and pathologic examinations (Part II) for all candidates (Groups A and B)* will be conducted in Atlantic City, N. J., June 8-11. *Applications for admission to Group A, Part II examinations must be on file not later than March 15.* Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh (6).

AMERICAN BOARD OF OPHTHALMOLOGY: *Written.* Various cities of the United States and Canada, March 2. (The only written examination in 1940.) Oral. New York, June 8-10. *Formal applications must be received before Jan. 1.* Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF OTOLARYNGOLOGY: New York, June 3-5. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

AMERICAN BOARD OF PEDIATRICS: New York, April 30 and May 1. Kansas City, Mo., preceding the Region III meeting of the American Academy of Pediatrics, Seattle, June 2. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York, Dec. 18-19. Sec., Dr. Walter Freeman, 1028 Connecticut Ave. N.W., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: Atlanta, Ga., Dec. 9-11. Sec., Dr. Byrl R. Kirklin, 102-110 Second Avenue S.W., Rochester, Minn.

AMERICAN BOARD OF UROLOGY: Chicago, Feb. 9-11. Sec., Dr. Gilbert J. Thomas, 1009 Nicollet Ave., Minneapolis.

Michigan June Examination

Dr. J. Earl McIntyre, secretary, Michigan State Board of Registration, reports the written examination held at Ann Arbor and Detroit, June 13-14, 1939. The examination covered fourteen subjects and included 100 questions. An average of 75 per cent was required to pass. Two hundred and five candidates were examined, all of whom passed. The following schools were represented:

School	PASSED Year Grad.	Per Cent
College of Medical Evangelists	(1939)	79.2,* 79.9
Yale University School of Medicine	(1937)	86.8
Georgetown University School of Medicine	(1938)	83.5
Emory University School of Medicine	(1938)	81*
Loyola University School of Medicine	(1939)	76, 80.1
Northwestern University Medical School	(1939)	80.8, 81.7, 82.1,* 83.4,* 83.5,† 85.1,* 85.2,* 86, 86.2
Rush Medical College	(1938)	82.2,* 82.5,* 85
The School of Medicine of the Division of Biological Sciences	(1938)	84.6, 87.4*
University of Illinois College of Medicine	(1938) (1939)	84.6,‡ 81, 83.5,* 87.9
Harvard Medical School	(1938)	81.9,* 83.4
Wayne University College of Medicine	(1938) (1939)	78.5,* 78.2,* 81.4,* 81.4, 83,* 83, 84.5, (1939)† 77, 78.4, 78.6, 79.6, 79.7, 80.3, 81, 81.3, 81.3, 81.3, 81.4, 82, 82.1, 82.2, 82.2, 82.2, 82.3, 82.6, 82.6, 82.7, 82.8, 82.9, 83.1, 83.1, 83.2, 83.3, 83.4, 83.5, 83.5, 83.5, 83.7, 83.9, 83.9, 83.9, 84, 84, 84.1, 84.2, 84.2, 84.3, 84.3, 84.7, 85.2, 85.3, 85.6, 85.7, 85.9, 86, 86.2, 86.8, 86.9, 87, 87.3, 87.5, 88.5
University of Michigan Medical School	(1938) (1939)	84.6,* 83.4, 79, 79.6, 79.8, 79.8, 80.2, 80.9, 81, 81.1, 81.1, 81.2, 81.3, 81.4, 81.4, 81.5, 81.6, 81.7, 81.7, 81.8, 81.8, 82, 82.1, 82.1, 82.2, 82.2, 82.2, 82.3, 82.5,‡ 82.5, 82.7, 83.4, 83.4, 83.4, 83.5, 83.6, 83.7, 84, 84, 84.1, 84.1, 84.2, 84.2, 84.3, 84.3, 84.3, 84.4, 84.4, 84.5, 84.6, 84.6, 84.7, 84.7, 84.7, 84.7, 84.7, 84.7, 84.8, 84.8, 84.9, 84.9, 85, 85, 85, 85, 85.2, 85.2, 85.3, 85.4, 85.5, 85.5, 85.5, 85.5, 85.6, 85.6, 85.6, 85.6, 85.7, 85.8, 86, 86, 86.1, 86.1, 86.3, 86.6, 86.7, 86.8, 86.9, 87, 87, 87.2, 87.3, 87.7, 88.1, 89.5
University of Minnesota Medical School	(1938) (1939)	81,* 78.9,* 85,* 85.6, 88.2*
St. Louis University School of Medicine	(1938)	82.5*
University of Nebraska College of Medicine	(1938)	90.8
Cornell University Medical College	(1938)	82.7*
Temple University School of Medicine	(1938)	85.7
University of Pittsburgh School of Medicine	(1938)	83.1
Meharry Medical College	(1937)	83.2
Baylor University College of Medicine	(1938)	85.5
University of Texas School of Medicine	(1936) 84, (1938)	86.5
Medical College of Virginia	(1938)	82.5*
University of Virginia Department of Medicine	(1938)	75*
Marquette University School of Medicine	(1939) 80.3,*	83.9
University of Wisconsin Medical School	(1937)	82.1*
McGill University Faculty of Medicine	(1938) 84.7, (1939)	85.9*

* Licenses have not been issued.

† These applicants have received the M.B. degree and will receive the M.D. degree on completion of internship. Licenses have not been issued.

‡ This applicant has completed the medical course and will receive the M.D. degree on completion of internship. License has not been issued.

§ This applicant has completed the medical course and will receive the M.D. degree on passing a comprehensive examination.

Colorado July Examination

Dr. Harvey W. Snyder, secretary, Colorado State Board of Medical Examiners, reports the written examination held at Denver, July 10-12, 1939. The examination covered eight subjects and included sixty-nine questions. An average of 75 per cent was required to pass. Fourteen candidates were examined, eleven of whom passed and three failed. The following schools were represented:

School	PASSED Year Grad.	Per Cent
Rush Medical College	(1938)	81
Creighton University School of Medicine	(1939)	80.3
McGill University Faculty of Medicine	(1934)	82.3
Osteopaths*	75.5, 78, 79, 80, 80.3, 82, 83.3, 83.3	
School	**FAILED**	**Per Cent**
Osteopaths*	73.5, 73.5, 74.5	

* Examined in medicine and surgery.

Pennsylvania July Examination

Dr. James A. Newpher, secretary, State Board of Medical Education and Licensure, reports the examination held at Philadelphia and Pittsburgh, July 5-8, 1939. Five hundred and twenty-five candidates were examined, 520 of whom passed and five failed. The following schools were represented:

School	PASSED Year Grad.	Number Passed
University of Arkansas School of Medicine	(1938, 2)	2
George Washington University School of Medicine	(1936), (1937), (1938, 12)	14
Georgetown University School of Medicine	(1938, 8)	8
Howard University College of Medicine	(1938, 3)	3
Emory University School of Medicine	(1937)	1
Loyola University School of Medicine	(1939, 6)	6
Northwestern University Medical School	(1938), (1939, 2)	3
Rush Medical College	(1937), (1938, 3)	4
State University of Iowa College of Medicine	(1938)	1
University of Kansas School of Medicine	(1938)	1
Louisiana State University School of Medicine	(1939)	1
Tulane University of Louisiana School of Medicine	(1937)	1
Johns Hopkins University School of Medicine	(1938, 3)	3
University of Maryland School of Medicine and College of Physicians and Surgeons	(1937, 3), (1938, 4)	7
Harvard Medical School	(1937, 2)	2
University of Minnesota Medical School	(1938), (1939)	2
St. Louis University School of Medicine	(1938, 6)	6
Washington University School of Medicine	(1938, 2)	2
Creighton University School of Medicine	(1933), (1938)	2
Columbia University College of Physicians and Surgeons	(1938)	1
Cornell University Medical College	(1937, 2)	2
Long Island College of Medicine	(1921), (1938, 2)	3
New York University College of Medicine	(1938)	1
University of Rochester School of Medicine	(1936)	1
Duke University School of Medicine	(1938, 2)	2
Ohio State University College of Medicine	(1938, 2)	2
University of Cincinnati College of Medicine	(1939, 2)	2
Western Reserve University School of Medicine	(1938)	1
Hahnemann Medical College and Hospital of Philadelphia	(1937), (1938).* (1938, 79)	81
Jefferson Medical College of Philadelphia	(1937, 23), (1938, 53)	76
Temple University School of Medicine	(1937, 21), (1938, 60)	81
University of Pennsylvania School of Medicine	(1937, 37), (1938, 55)	92
University of Pittsburgh School of Medicine	(1938, 59)	59
Woman's Medical College of Pennsylvania	(1937, 3), (1938, 9)	12
Medical College of the State of South Carolina	(1936)	1
Meharry Medical College	(1938)	1
University of Tennessee College of Medicine	(1937, 2)	2
Medical College of Virginia	(1937), (1938, 2)	3
University of Virginia Department of Medicine	(1937), (1938)	2
Marquette University School of Medicine	(1939)	1
University of Wisconsin Medical School	(1937)	1
University of Toronto Faculty of Medicine	(1938).* (1938, 3)	4
University of Western Ontario Medical School	(1937)	1
McGill University Faculty of Medicine	(1938, 2)	2
Medizinische Fakultät der Universität Wien	(1937, 2), (1938)	3
Univerzita Komenského Fakulta Lekárska, Bratislava	(1938)	1
Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin	(1936)	1
Rheinische Friedrich-Wilhelms-Universität, Bonn	(1938)	1
Universität Heidelberg Medizinische Fakultät	(1936)	1

Regia Università degli Studi di Roma. Facoltà di Medicina e Chirurgia	(1936, 2), (1937, 2)	4
American University of Beirut School of Medicine	(1934)	1
Licentiate of the Royal College of Physicians, of the Royal College of Surgeons of Edinburgh and of the Royal Faculty of Physicians and Surgeons of Glasgow	(1937), (1938, 2)	3
University of Edinburgh Faculty of Medicine	(1937)	1
Universität Zürich Medizinische Fakultät	(1938)	1

School	FAILED	Year Grad.	Number Failed
Temple University School of Medicine		(1938)	1
Medizinische Fakultät der Universität Wien		(1937)	1
Christian-Albrechts-Universität Medizinische Fakultät, Kiel		(1913)	1
Friedrich-Alexanders-Universität Medizinische Fakultät, Erlangen		(1937)	1
Regia Università degli Studi di Palermo. Facoltà di Medicina e Chirurgia		(1937)	1

Six physicians were licensed by reciprocity and eight physicians were licensed by endorsement from July 28 through September 20. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Tulane University of Louisiana School of Medicine		(1923)	R. Island
University of Michigan Medical School		(1938)	Michigan
University of Nebraska College of Medicine		(1936)	Nebraska
University of Cincinnati College of Medicine		(1935)	Ohio
Temple University School of Medicine		(1937)	New Jersey
Marquette University School of Medicine		(1935)	Wisconsin

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Yale University School of Medicine		(1933), (1938)	N. B. M. Ex.
Georgetown University School of Medicine		(1936)	N. B. M. Ex.
Johns Hopkins University School of Medicine		(1933)	N. B. M. Ex.
Columbia University College of Physicians and Surgeons		(1924)	N. B. M. Ex.
Hahnemann Medical College and Hospital of Philadelphia		(1938)	N. B. M. Ex.
Jefferson Medical College of Philadelphia		(1937)	N. B. M. Ex.
University of Pennsylvania School of Medicine		(1934)	N. B. M. Ex.

* Licenses have not been issued.

Nevada Reciprocity Report

Dr. John E. Worden, secretary, Nevada State Board of Medical Examiners, reports three physicians licensed by reciprocity June 20 and August 7. The following schools were represented:

School	PASSED	Year Grad.	Reciprocity with
University of Southern California School of Medicine		(1938)	California
Tulane University of Louisiana School of Medicine		(1937)	Louisiana
University of Cincinnati College of Medicine		(1934)	Ohio

Connecticut Homeopathic Examination

Dr. Joseph H. Evans, secretary, Connecticut Homeopathic Medical Examining Board, reports the written examination held at Derby, July 11-12, 1939. The examination covered seven subjects and included seventy questions. An average of 75 per cent was required to pass. Two physicians were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Hahnemann Medical College (1939) 81		(1938)	84.2,

Hawaii July Report

Dr. James A. Morgan, secretary, Board of Medical Examinations, Territory of Hawaii, reports the oral and written examination held at Honolulu, July 10-13, 1939. The examination covered ten subjects and included eighty questions. An average of 75 per cent was required to pass. Four candidates were examined, all of whom passed. Three physicians were licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Stanford University School of Medicine		(1930)	78.7
Harvard Medical School		(1937)	84.3
University of Michigan Medical School		(1935)	82.1
University of Pennsylvania School of Medicine		(1936)	86.2

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Tulane University of Louisiana School of Medicine		(1936)	N. B. M. Ex.
Creighton University School of Medicine		(1935)	N. B. M. Ex.
University of Cincinnati College of Medicine		(1936)	N. B. M. Ex.

Book Notices

The Building of a Nation's Health. By Sir George Newman, G.B.E., K.C.B., M.D. Cloth. Price, $4. Pp. 479, with 9 Illustrations. New York & London: Macmillan Company, 1939.

Here is a complete and detailed account of the history and growth of the machinery charged with the maintenance of health in Great Britain. The author, Sir George Newman, was chief medical officer to the board of education from 1907 to 1935 and chief medical officer to the ministry of health from 1919 to 1935. The book is therefore authoritative because of his first hand association with the work it discusses. It provides also, however, an accurate history of the beginnings of the school medical service, of health insurance and of the ministry of health in Great Britain.

It is found on study of this book that English medicine and public health are governed by a variety of agencies and that it has been difficult, if not impossible, to correlate these activities with newly developed endeavors. Thus, in Great Britain as in this country, there are many different agencies involved in the care of the sick and in the prevention of disease, and the health insurance system has perhaps helped along some lines but interfered in others. Indeed, Sir George points out that the health insurance system is a practitioners' service only, without a consultative or specialist element, without laboratories or nurses or hospital accommodations for observation, and quite ineffective in developing cooperation between the insurance committees and the health authorities. There seems to be little doubt that the health insurance act has been advantageous to the medical profession and perhaps even good for the people, since it provides them with a better medical service than they had formerly, but the scheme is neither complete nor perfect. Sir George says that its medical scope is still too restricted; there is observable too great a tendency to the "bottle of medicine" treatment as palliative, and the accurate diagnosis, effective treatment and actual preventive measures are sometimes conspicuous by their absence. He believes that some thousands of the eight million patients dealt with under this act are not really satisfied "not because they do not get well but because they do not receive the attention which they expected." He then continues: "Every unsatisfied patient is, de facto, a criticism of his doctor. In private practice that is his own affair; but in a state system of practice, in which the treatment has been already paid for, it becomes a breach of contract, damaging to the doctor, the service and the state. Again, public opinion declares that a substantial number of practitioners are careless, even negligent, in their insurance practice, that some panels are too large to ensure adequate attention to the individual patient, that the sickness and 'incapacity' certificates are granted too liberally, that 'multiple surgeries' are disadvantageous, and that large 'firms' of insurance practitioners exclude 'freedom of choice' of doctor by the patient. The approved societies have more than once complained of excessive certification of 'incapacity' (resulting in undue payment of cash benefit) and excessive prescribing. Both of these complaints were fully investigated by the ministry (1927-1931) and both were proved to be justified."

In the final section of his book, entitled "Whence and Whither?" Sir George provides an analysis of the chief gains made in the field of preventive medicine. The first three practical health movements were for sanitation and sanitary cleanliness, the establishment of primitive hospitals, and the practical knowledge of the contagiousness of disease and the necessity for quarantine. Then came water supply. Next came notification of infectious diseases and registration of the cause of death. Next came vaccination for smallpox and thereafter control of the wholesomeness of food, meat and milk, reform in housing, improvement in lighting, ventilation, cleanliness and reduction of overcrowding. The great problem remaining for legislative control, he says, was provision of effective medical treatment of the sick. As evidence of the accomplishments, Sir George analyzes the sickness and death rates so far as they are available, and he cites these benefits to prove that the intervention of the state in behalf of national health has had a beneficial effect. He fails, however, as a scientist should, to take account

of the fact that similar, if not better, results have been achieved in some nations where the state has not intervened to nearly the same extent.

He feels that national health depends first on knowledge of the science and art of medicine and then on its social application by the medical practitioner, by the state and by the people of that state. What is still needed is better application by the state and wider usage by the people. He makes a great plea for education of all the people in the science and art of health.

L'examen du malade: Guide clinique de l'étudiant et du médecin. Médecine, chirurgie, obstétrique, neurologie et spécialités. Par MM. P. Delmas et al professeurs à la Faculté de médecine de Montpellier. Second edition. Paper. Price, 65 francs. Pp. 985. Paris: Masson & Cie, 1939.

It seems that the most cogent criticism of the manual is to be found in its subtitle: "Clinical Guide for Students and Physicians in Medicine, Surgery, Obstetrics, Neurology and Specialties." In other words, the scope of the compendium, intended primarily for the use of medical students and interns, is to describe history writing in cases belonging either to one of the fields mentioned or to dermatology, pediatrics, otorhinolaryngology, ophthalmology or gynecology. Moreover, the present edition has been enlarged by addition of chapters on psychiatry and endocrinology. The author and his collaborators had no intention of offering a treatise on symptomatology or diagnosis and limited themselves to showing the intern how to interrogate and examine the patient and to record the results. The concise epitome has been written in a simple, succinct manner but the enormous field covered and the small format of the book exclude an adequate discussion of many subjects. Perusal of numerous sections chosen at random reveals that much essential information has been omitted. For instance, in the discussion of leukorrhea on page 146 Trichomonas infection is not mentioned as the possible source of the vaginal discharge. Not less than ninety-three pages is devoted to the description of normal laboratory observations and indications for various research methods, without mentioning how to perform the tests. Owing to the vastness of the material, only few chapters cover the subject in a more than elementary manner; on the whole, the usefulness of the manual will be limited to beginners, to whom it may prove to be a handy guide.

Psychological Factors in Marital Happiness. By Lewis M. Terman and others. Cloth. Price, $4. Pp. 474, with 28 illustrations. New York & London: McGraw-Hill Book Company, Inc., 1938.

In this book the authors discuss the marital satisfaction experienced by 2,484 subjects, including 1,133 married couples and 109 divorced couples. The technic used was psychometric. The various chapters describe the psychologic factors in marital compatibility and the development of an index of marital happiness. There are studies of the personalities of happily married and unhappily married people, with special relation to the family background. Then there are four chapters dealing with sexual factors. Here the authors discuss sleeping arrangements, contraceptive technics, sexual complaints and similar matters.

In estimating their index of marital happiness, the authors concern themselves with such matters as customary methods of settling disagreements, regret of marriage, choice of spouse if life was to be lived over, and a complete score based on domestic grievances. The happiness index and the personality tests are also significant. The authors found, for example, that the presence of children often prevents the breaking up of marriage but that it has little effect on the general level of marital happiness. Much nonsense has been written, they say, about the risks entailed in marrying on an inadequate income or marrying out of one's age or educational group. The correlation of income with happiness is zero. The happiest wives are from four to ten years older than their husbands; the happiest husbands are twelve or more years older than their wives. As for religious training, they say that if this was ever a factor in marital happiness it appears no longer to exert such an influence. As to relative mental ability, the most favorable condition is equality or near equality. Marked mental superiority of the husband makes for happiness in the wife but for unhappiness in the husband. Marked inferiority of the husband makes the wife unhappy but does not greatly affect the husband.

The ten background circumstances most predictive of marital happiness are:

1. Superior happiness of parents.
2. Childhood happiness.
3. Lack of conflict with mother.
4. Home discipline that was firm, not harsh.
5. Strong attachment to mother.
6. Strong attachment to father.
7. Lack of conflict with father.
8. Parental frankness about matters of sex.
9. Infrequency and mildness of childhood punishment.
10. Premarital attitude toward sex that was free from disgust or aversion.

Most significant is the conclusion of the authors that sex technics, which many writers regard as the primary key to happy marriage, may be worth cultivating for their immediate sensuous returns but exert no appreciable effect on happiness scores. It is interesting to realize that about 33 per cent of women fail to achieve sexual satisfaction in marriage.

The authors find that the key to happiness in marriage is not to be found in sexual compatibility and, in fact, is no greater than that of the combined personality and background factors and is probably less. It is interesting to note that one of the most important factors is such a small matter as the wife's slovenliness in appearance. This book contains a vast amount of important data and suggestions for physicians who may frequently be concerned with these problems.

Practice of Allergy. By Warren T. Vaughan, M.D. Cloth. Price, $11.50. Pp. 1,082, with 338 illustrations. St. Louis: C. V. Mosby Company, 1939.

In 1930 the author published a book on allergy and applied immunology, and a second edition came out in 1934. Both those works were planned for physician and patient, but now allergy has advanced so greatly that a volume of almost 1,100 pages is needed to present the subject as it concerns the physician alone. The physician who specializes in allergy must nowadays be not only an internist but also thoroughly familiar with the diseases of the skin and those that affect children and must have more than an ordinary knowledge of the conditions affecting the nose and throat. In addition, he must have a good knowledge of botany, bacteriology and parasitic conditions. In this work the author first presents the history and basis of his subject and then proceeds to diagnosis, food allergies, conditions developed by pollens and by bacteria pharmacology, and the specific allergic diseases. The work is supplemented with a bibliography and an excellent index. An added feature is a collection of excellent portraits of pioneers in this field. The author's personal experience is reflected throughout the book. The records of his cases, supplemented by excellent photographs, make the volume individual beyond most other textbooks in this field. Any physician who wishes to have easily available a complete reference work on this subject will do well to avail himself of what Dr. Vaughan offers. The amount of detailed information is vast and is not available elsewhere under one cover.

Money to Burn: What the Great American Philanthropic Foundations Do with Their Money. By Horace Coon. Cloth. Price, $3. Pp. 352. New York, Toronto & London: Longmans, Green & Co., 1938.

For some time there has been intense interest in the question as to what place will be occupied in the future by the great foundations established by the multimillionaires of the past. The author begins by describing the development of the various foundations and their relationship to the law. Then he discusses particularly the Carnegie and Rockefeller Foundations, including the General Education Board. Unfortunately, he has depended primarily on the New York *Times* for his information, and therefore much of what he says is colored by the established policies of that paper. A small space is devoted to the Duke Foundation, the Brookings Foundation, the Spelman Fund, the Twentieth Century Fund, Chemical Foundation and others. The chapter called "Public Health and Private Philanthropy" is full of misstatements of fact and inconsistencies and indicates the very casual manner in which the whole book is written. The statement is made that the federal government appropriates less than $5,000,000 a year for public health, whereas the actual amount spent by the federal government is more nearly $125,000,000 a year. In

this chapter the author discusses principally the Rockefeller Foundation and the Commonwealth Fund. The discussion of the Milbank Fund is a defense of Kingsbury vs. the American Medical Association. Here the author apparently accepts what has been said by Rorty as gospel and repeats all the unestablished charges relative to boycotts of the Borden Company. Next comes a statement relative to the Kellogg Foundation and the American Foundation. The entire chapter is obviously taken by the author out of the New York *Times*, and the resulting pathologic specimen is just what any physician with a knowledge of genetics would expect. The book ends with a sort of conclusion that multimillionaires give their money to foundations in order to help protect the money that they do not give away. The author apparently believes that the government should take over the foundations in some manner because they are indirectly perpetuating monopolies.

Sleep and Wakefulness as Alternating Phases in the Cycle of Existence. By Nathaniel Kleitman, Department of Physiology, The University of Chicago, Chicago. Cloth. Price, $5. Pp. 638, with 33 illustrations. Chicago, Illinois: University of Chicago Press, 1939.

Among a mass of literature on sleep published in recent years the book by Kleitman comes as a refreshing, scientific document in the midst of theory, superstition and suggestion. The author, who is associate professor of physiology at the University of Chicago, has done sixteen years' observational and experimental work on this subject. He provides evidence of the functional differences between wakefulness and sleep and discusses the periodicity of sleep and the factors that disturb the sleep-wakefulness cycle. He also discusses states resembling sleep, such as hibernation and hypnosis, and concludes with an analysis of the various theories of sleep. An exceedingly practical chapter deals with the hygiene of sleep. The book is complete with a bibliography and an index. The book is beautifully printed, the style is excellent and the reasoning is sound. The author concludes that cortical dominance is the principal feature in the development of the vertebrate nervous system and is also the determining factor in prolonging the time allotted to the wakefulness phase and in adapting the rhythm of sleep to the diurnal alternation of night and day. He has proved by physiologic experiments many facts which people frequently find out for themselves. For example, if a drowsy person is removed from the influence of light and sound and assumes a horizontal position on a comfortable bed, he will not need anything to produce the onset of sleep. The sleep problem is not solved by the research here presented because there are still many facts that only scientific experimentation can establish, but this volume comes nearer to being a scientific evaluation of all the facts heretofore accumulated than any other work on the subject thus far available.

Künstliche Fiebererzeugung mit Kurzwellen: Kurzwellen-Hyperthermie. Von Dozent Dr. med. habil. Ernst Raab. Boards. Price, 5.50 marks. Pp. 158, with 36 illustrations. Leipzig: Georg Thieme, 1939.

This textbook on the artificial production of fever by means of short radio waves is the first comprehensive work on fever therapy to appear in Germany. The information contained in it is based to a certain extent on personal researches of the author, which have been performed with apparent enthusiasm. The book is divided into two sections: the first deals with the various methods of production of artificial fever and the second concerns the clinical applications of fever therapy. There is a description of the historical developments of artificial fever, a chapter on the production of fever by chemical means and, following this, chapters dealing with the various physical methods of fever production. The use of radiant heat and hot baths is mentioned, and the Kettering hypertherm (hot, humid air cabinet) is described briefly. The author apparently has a wrong conception of this device, since he argues that because it never has been marketed commercially it probably is not a satisfactory apparatus. As a matter of fact, the device was prepared simply as an apparatus to be used in research, and a number of commercial concerns now manufacture appliances which embody its principles.

The author lays particular stress on the production of fever by short wave diathermy, and ample reference is made to the work of American authors. Strangely enough, certain earlier publications in the author's own language, such as those by Köhler of Geneva and those emanating from the neurologic clinic in Vienna, have not been mentioned by the author. He presents a careful description of the differences between the production of fever by means of the condenser field and the electromagnetic field. Such descriptions previously have been presented not only by Kowarschik in Vienna but also by certain American authors. Although the author admits that he has not employed the method himself, he criticizes the technic of fever production by means of short wave diathermy as employed by certain French authors. Whereas he is naturally enthusiastic about his own technic, which would seem adequate, nevertheless, probably because of unfamiliarity with other methods, he seems to be too critical of certain excellent methods of production of fever. According to the technic of the author of this work, the patient is placed in a fever bag, which is closed by means of a slide fastener and lies on a hammock-like table. The author employs a two tube short wave diathermy machine, the energy output of which is divided into two portions and is conveyed to the patient by means of two coils. The author reports that he has had no severe complications or deaths in about 700 treatments. The systemic temperature of the patient is raised to 40 or 41 C. (from 104 to 106 F.) and is maintained for several hours. The author cites instances in which this technic has been employed in the treatment of patients more than 60 years of age without untoward complications. In a special chapter, physical fevers are compared to artificial fevers produced by malaria. The author is strongly in favor of the use of physical fevers. In the section on clinical uses of hyperthermy by means of short wave diathermy, brief descriptions of the various conditions in which the treatment is considered indicated precede discussion of the treatment.

Whereas, especially in discussing the treatment of certain of these diseases by means of fever therapy, the author rather limits himself, he has drawn freely on the statistical studies of American authors for support of his conclusions. Among the diseases for which fever therapy is recommended are listed cerebrospinal syphilis, gonorrhea, arthritis, multiple sclerosis, chorea, poliomyelitis and neuritis. As the first German textbook on this subject, the volume may be considered a valuable contribution and any one interested in fever therapy will find much of interest in it.

We Didn't Ask Utopia: A Quaker Family in Soviet Russia. By Harry and Rebecca Timbres. Cloth. Price, $2.50. Pp. 290. New York: Prentice-Hall, Inc., 1939.

This volume comes with an introduction by Walter Duranty, who certainly knows about Russia, and Dr. C.-E. A. Winslow, who knows the authors and who met them at the Hotel National in Moscow in 1936. The book includes the letters of Mr. Harry Timbres, the journal of his wife, and some reference to their children. The authors, who are Quakers, went to Russia to study the system and particularly to look at socialized medicine. Harry Timbres was interested in the prevention of malaria, and shortly after their arrival in Russia they made contacts with Russian health authorities and with Dr. Sigerist. The letters give a clear picture of events in Russia and particularly of the antimalaria work. The journal of Rebecca Timbres reveals much more of Russian habits of mind and of the conditions than do the letters of Harry Timbres. It is interesting to read at this time Litvinov's statement on war and to realize how far Russia has departed from that point of view. There is an interesting letter from the author to Dr. John Kingsbury, in which he points out that the Russian system does not supply any of the element of personal touch which characterizes private practice at its best and also gives his opinion that Russia had better work out the system before America experiments with it. The book reveals also the primitive conditions of living and inadequacy of food which must prevail among the mass of the people. The author and his wife had to use one half of their entire income, while working for the health of Russia, to purchase the limited food that was required by the family. Saddest of all in this work is the description of the ultimate infection and death of Harry Timbres, particularly his refusal to go to the Marbum Hospital after he developed typhus, and his desire to go to the University Hospital at Kazan. This book is revealing in more ways than one on the Russian medical system and on the American interests which would transfer that system to this country.

Secretarial Efficiency. By Frances Avery Pausee. With the collaboration of Frederick G. Nichols. Cloth. Price, $3.50. Pp. 601, with illustrations. New York & London: Whittlesey House, McGraw-Hill Book Company, Inc., 1939.

The author has been secretary to the editor of the *Atlantic Monthly* and assistant to the business manager of Wellesley College. These two jobs ought to indicate that she herself is efficient. Her book offers a vast amount of advice to the girl who wants to rise in the profession of secretary and includes a discussion of important traits. Incidentally, she also discusses such detailed matters as the way in which the girl receiving dictation ought to sit, and she even discusses the executive who begins to dictate before the girl has time to sit. She mentions all the things that a secretary should ask the executive after he has finished his dictation so as to remind him of what he forgot. There are discussions of spelling, spacing, memorandums, telephone, handling of callers, making of files and appointments, and there is even a section on what the secretary is to do with her spare time, if any. The book has so much to say about so many little things which are significant in the life and work of a secretary that it is bound to be helpful to any secretary who has intelligence enough to be an efficient secretary in the first place.

Surgery of the Eye. By Meyer Wiener, M.D., Professor of Clinical Ophthalmology, Washington University School of Medicine, St. Louis, and Bennett Y. Alvis, M.D., Assistant Professor of Clinical Ophthalmology, Washington University School of Medicine, St. Louis. Cloth. Price, $8.50. Pp. 445, with 394 illustrations. Philadelphia & London: W. B. Saunders Company, 1939.

For many years the American ophthalmologist has awaited a surgery of the eye which would not be a translation of a foreign textbook and which also would give in simple but descriptive words a practical treatise which could be used in everyday work. The authors of this small volume have achieved such an ideal. In addition the written technic has been combined with excellent drawings of the various stages in many operative procedures. This emphasis on clarity has made manifold the value of the book. Perhaps the most striking peculiarities of the text are the enunciation of surgical principles, the items of personal experience found inserted from time to time in all portions and the dogmatic statements of tried and proved methods which the authors have experienced in a long and busy surgical eye practice. In scope the authors have left little to be desired. Indeed no ophthalmologist in an English speaking country can afford to leave such a textbook off his "must" list.

Epidemic Encephalitis: Etiology, Epidemiology, Treatment. Third Report by the Matheson Commission. Willard C. Rappleye, Chairman. Fabrikoid. Price, $3. Pp. 493. New York: Columbia University Press. 1939.

This is a complete contribution on epidemic encephalitis. It is the third report of the Matheson Commission and comprises etiology, epidemiology and treatment. It consists of five chapters: (1) the work of the commission; (2) summary of investigation on etiology of encephalitis due to epidemic, St. Louis type, Japanese B, equine encephalomyelitis, postvaccinal and postinfectious, hemorrhagic and australian X-disease; (3) various allied diseases such as louping ill, lymphocytic choriomeningitis and the Guillain-Barré syndrome; (4) summary of the treatment of encephalitis with a description of about forty-eight methods of treatment; (5) epidemiology of epidemic encephalitis, St. Louis and Japanese B types of encephalitis. There is a comprehensive bibliography of about 3,510 papers on encephalitis. There is an excellent index. This book is recommended to all medical men as well as to bacteriologists, neurologists and pathologists.

Microbiology Applied to Nursing: A Combined Text Book and Laboratory Guide. By Jean Broadhurst, Ph.D., Professor of Bacteriology, Teachers College, Columbia University, New York, and Leila I. Given, B.N., M.S., Professor of Nursing Education, and Director, Department of Nursing Education, South Dakota State College. Fourth edition. Cloth. Price, $3. Pp. 653, with 316 illustrations. Philadelphia, Montreal & London: J. B. Lippincott Company, 1939.

The publication of this edition furnishes adequate recognition of the book's usefulness for the purpose for which it is designed. It is clearly written and well arranged to accompany the lectures and that small amount of laboratory work available to student nurses who must obtain some knowledge of the fundamentals of bacteriology.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Harrison Narcotic Act: Right of Florida Naturopaths to Registration.—The attorney general of Florida rendered an opinion to the effect that naturopaths may not prescribe or dispense narcotic drugs in the state. Basing his action on this opinion, the United States Collector of Internal Revenue for the District of Florida undertook to cancel naturopath Perry's registration under the Harrison Narcotic Act and to compel him to surrender the special narcotic stamp and order forms previously issued to him. The collector, too, refused to register naturopath Detwiler under the act. Each naturopath instituted suit against the collector in the United States district court, Florida, southern division, and the suits were consolidated for hearing.

The Harrison Narcotic Act provides that "physicians . . . and other practitioners, lawfully entitled to distribute, dispense, give away, or administer" narcotic drugs are entitled to register with the collector and receive from him a special stamp and order forms to be used in the purchase of narcotics. Who are physicians or other practitioners, the court pointed out, is to be determined by the law of the state where the applicant resides. The Florida narcotic act provides that the term "'physician' means a person authorized by law to practice medicine in this State and any other person authorized by law to treat sick and injured human beings in this State *and* to use, mix or otherwise prepare narcotic drugs in connection with such treatment." The Florida naturopathic act defines the word "naturopathy" to mean "the use and practice of psychological, mechanical and material health sciences to aid in purifying, cleansing and normalizing human tissues for the preservation or restoration of health according to the fundamental principles of anatomy, physiology and applied psychology, as may be required." Naturopathic practice, as recognized by the act, employs among other elements phytotherapy, which, the court said, means treatment by means or with the aid of plants or remedies of botanic origin. The naturopaths contended that phytotherapy embraces all botanic preparations and their compounds, including morphine, a derivation of opium, which in turn is a product of botanic origin, and that therefore they were authorized to prescribe and administer morphine and other narcotics of botanic origin.

The Florida naturopathic act, the court said, clearly does not recognize naturopaths as medical doctors, nor the practice of naturopathy as the practice of medicine. On the contrary, it authorizes licensees thereunder to practice the art of healing only in a limited and defined field called "naturopathy." That act, immediately after recognizing phytotherapy as a permissible method of treatment in naturopathy, continues with the following proviso: "Provided, however, that nothing in this Chapter shall be held or construed to authorize any naturopathic physician licensed hereunder to practice materia medica or surgery . . ." Literally, the court pointed out, materia means "medical material." To practice materia medica is to engage in that branch of medical science which deals with drugs, their sources, preparations and uses. The proviso is an express limitation on or qualification of the general authority of naturopaths as expressed in the general enacting clauses which precede the proviso. Though phytotherapy relates generally to healing with the aid of remedies of botanic origin, whatever is included in the practice of materia medica, that is, that branch of medical science which deals with drugs, their sources, preparations and uses, is expressly forbidden to naturopaths by the proviso. The act authorizes naturopaths to deal with botanic remedies contemplated by phytotherapy, exclusive of those embraced in materia medica. The situation is not altered by the fact that narcotics are used merely as a palliative to overcome pain rather than as a specific treatment for an ailment, the court said.

The Florida naturopathic act, while referring generally to phytotherapy as embraced within the practice of naturopaths,

does not, in prescribing a course of study for naturopaths, include botanic compounds or extracts generally, nor narcotics. This omission, the court thought, was in harmony with the restrictive proviso which prohibits the practice of materia medica by naturopaths. If naturopaths are to prescribe or dispense narcotic drugs in Florida, the court concluded, they must first secure legislative authority.

Judgment in each case was rendered for the defendant Collector of Internal Revenue. Naturopath Perry appealed to the United States circuit court of appeals, fifth circuit, which affirmed the judgment of the district court.—*Perry v. Larson, Collector of Internal Revenue: Detwiler v. Same, 25 F. Supp. 728; Perry v. Larson, Collector of Internal Revenue, 104 F. (2d) 728.*

Malpractice: Infection Following Hypodermic Injection of Morphine.—The plaintiff sued the defendant physicians, alleging that an infection in his arm was due to the negligence of the physicians' employees in administering morphine hypodermically. At the conclusion of the plaintiff's evidence, the trial court instructed a verdict for the physicians on the ground that the plaintiff offered no expert medical testimony that the infection in his arm was caused by anything done or omitted to be done by the physicians or their employees, and on the ground that there was no evidence showing a causal connection between the wrong complained of and the injury resulting. The plaintiff then appealed to the court of civil appeals of Texas, Austin.

In the case of *Floyd* v. *Michie*, 11 S. W. (2d) 657, said the court in the present case, it was held:

> The law entertains in favor of a physician the presumption that he has discharged his full duty, and to defeat this presumption the law exacts affirmative proof of breach of duty coupled with affirmative proof that such breach of duty resulted in injury. Negligence is never imputed from results, nor is any inference thereof indulged in against a physician . . . To warrant the finding of civil malpractice there must be expert medical testimony to establish it and to establish the additional fact that death resulted from such malpractice. There being no expert medical testimony establishing such issues, the court properly instructed a verdict for the defendants.

In the present case, there was no testimony by a medical expert that the infection in the plaintiff's arm was caused by the hypodermic needle or that it resulted from negligent acts of the defendants.

What is an infection and whence it comes are matters determinable only by medical experts. As applied in the present case, infection, the court said, means internal inflammation where pus is formed by the presence of pus germs. Without medical testimony as to the probable cause of an infection or its source, the court and jury are not qualified to pass on the question. The mere fact that infection set up in the plaintiff's arm three or four days after a hypodermic needle had been injected will not suffice as proof of negligence in failing to sterilize the needle or skin of the plaintiff's arm before the injection. Infection comes from many sources, and there must be affirmative proof of such negligence or lack of care, and that the injuries complained of resulted therefrom. Such proof can be established only by the testimony of experts skilled in the medical and surgical profession.

The judgment of the trial court was affirmed.—*Kaster v. Woodson et al. (Texas), 123 S. W. (2d) 981.*

Workmen's Compensation Acts: Melanocarcinoma Attributed to Constant Irritation of Mole.—The employee was engaged in the operation of machinery used in the manufacture of building blocks of sand, ashes and cement. Sand and ashes accumulated where he stood and some would get into his shoes, requiring him to empty them several times a day. On July 15, 1936, according to his testimony, he found at the end of the day's work on removing his sock that it stuck to a congenital mole on his left foot, that a tan colored stain was left on the mole where the sock had covered it and that there were sand and ashes around it. He testified that in the afternoon of that day he had felt pain at the site of the mole but that it did not bother him thereafter, except a "little bit," nor prevent his continuing at his work for several weeks. About four weeks thereafter the mole started to "ooze," and he consulted a physician who advised him to go to a hospital. He did so two days later and remained there for three days, during which time the mole was cut out. Six weeks later he returned to the hospital and a further and more extensive operation was performed on his foot and leg. The attending physician diagnosed the condition as melanocarcinoma. The employee was denied compensation under the workmen's compensation act of New Jersey; the trial court affirmed that denial and the employee brought the judgment of the trial court for review before the supreme court of New Jersey. Subsequently the employee died, death being caused by the melanocarcinoma.

The employee's condition, in the opinion of the supreme court, was caused by the constant irritation of the mole by the sand and ashes with which it came in contact. It was not of accidental origin within the meaning of the workmen's compensation act but rather was an occupational disease for which no compensation was provided by the act. The first symptoms, the sticking of the sock to the mole and the stain on the mole, were not accompanied by any fall, blow or other trauma.

Because there was no accident that caused the disease or that caused a latent condition of the disease to flare up, the judgment of the trial court for the employer was affirmed.—*Bollinger v. Wagaraw Bldg. Supply Co. (N. J.), 3 A. (2d) 810.*

Workmen's Compensation Acts: Refusal of Employee to Submit to Operation.—An employee, said the court of appeal of Louisiana, cannot under the provisions of the workmen's compensation act be required to submit to an operation to relieve a disability when the medical testimony shows that the operation will be accompanied by great pain and may seriously endanger life, or when there is doubt as to the removal of the disability by the operation. In such a case the employee is not required to endanger his life or gamble with his chance of recovery by submitting to a dangerous and uncertain operation. But when the medical testimony shows that the operation is a minor one, unattended by danger of any serious consequences, with little pain and suffering and with almost a certainty of success and relief from the disability, it would be unfair and inequitable for the employee to continue to draw full compensation when he had it within his power to minimize the damage by submitting to a minor and relatively simple operation.—*Leday v. Lake Charles Pipe & Supply Co. (La.), 185 So. 655.*

Society Proceedings

COMING MEETINGS

American Association for the Study of Neoplastic Diseases, Baltimore, Dec. 28-30. Dr. Eugene R. Whitmore, 2139 Wyoming Avenue N.W., Washington, D. C., Secretary.

American Society of Anesthetists, Los Angeles, Dec. 14. Dr. Paul M. Wood, 745 Fifth Ave., New York, Secretary.

Annual Congress on Industrial Health, Chicago, Jan. 15-16. Dr. C. M. Peterson, 535 North Dearborn St., Chicago, Secretary.

Eastern Section, American Laryngological, Rhinological and Otological Society, Pittsburgh, Jan. 5. Dr. John R. Simpson, Medical Arts Bldg., Pittsburgh, Chairman.

Middle Section, American Laryngological, Rhinological and Otological Society, Kansas City, Mo., Jan. 19. Dr. Sam E. Roberts, Professional Bldg., Kansas City, Mo., Chairman.

Radiological Society of North America, Atlanta, Ga., Dec. 11-15. Dr. Donald S. Childs, 607 Medical Arts Bldg., Syracuse, N. Y., Secretary.

Society for the Study of Asthma and Allied Conditions, Philadelphia, Dec. 9. Dr. W. C. Spain, 116 East 53d St., New York, Secretary.

Society of American Bacteriologists, New Haven, Conn., Dec. 28-30. Dr. I. L. Baldwin, Agricultural Hall, University of Wisconsin, Madison, Wis., Secretary.

Southern Section, American Laryngological, Rhinological and Otological Society, Columbia, S. C., Jan. 8-9. Dr. Walter J. Bristow, Doctors Bldg., Columbia, S. C., Chairman.

Southern Surgical Association, Augusta, Ga., Dec. 5-7. Dr. E. Alton Ochsner, 1430 Tulane Ave., New Orleans, Secretary.

Western Section, American Laryngological, Rhinological and Otological Society, Los Angeles, Jan. 26-27. Dr. Pierre Viole, 1930 Wilshire Blvd., Los Angeles, Chairman.

Western Surgical Association, Los Angeles, Dec. 15-16. Dr. Albert H. Montgomery, 122 South Michigan Blvd., Chicago, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1929 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Heart Journal, St. Louis

18:261-388 (Sept.) 1939

Factors Influencing Auricular Murmur and Intensity of the First Heart Sound. E. A. Stead Jr. and P. Kunkel, Boston.—p. 261.
Effect of Posture on Form of Precordial Leads of Electrocardiogram. H. J. Stewart and R. L. Bailey, New York.—p. 271.
Infra-Red Photographic Demonstration of Superficial Venous Pattern in Congenital Heart Disease with Cyanosis. B. S. Epstein, Brooklyn.—p. 282.
Plethysmographic Studies of Peripheral Blood Flow in Man: III. Effect of Smoking on Vascular Beds in Hand, Forearm and Foot. D. I. Abramson, Cincinnati; H. Zaaeela and B. S. Oppenheimer, New York.—p. 290.
*Heart Sounds in Young Adults. H. A. Sacks and R. C. Roberts, Chicago.—p. 303.
Significance of Duration of Q3 with Respect to Coronary Disease. R. H. Bayley, New Orleans.—p. 308.
Treatment of Occlusive Arterial Disease of Legs by Means of Sanders Vascillator (Sanders Bed). N. W. Barker and Grace M. Roth, Rochester, Minn.—p. 312.
Syndrome of Superior Vena Caval Obstruction. L. A. Soloff, Philadelphia.—p. 318.
Cold Pressor Reaction in Normal Subjects and in Patients with Primary (Essential) and Secondary (Renal) Hypertension. J. H. Miller and M. Bruger, New York.—p. 329.
Clinical Significance of Right Axis Deviation in Electrocardiogram. W. J. Comeau and P. D. White, Boston.—p. 334.
Precordial Electrocardiogram in Myocardial Infarction: II. Observations on Cases of Infarction of Posterior Wall of Left Ventricle. C. E. Kossmann and C. E. de la Chapelle, New York.—p. 344.
Id.: III. Observations on Cases in Which Lesions Were Diffuse. C. E. Kossmann and C. E. de la Chapelle, New York.—p. 352.
Method for Study of Ventricular Fibrillation. B. Blumenthal and Enid Tribe Oppenheimer, New York.—p. 363.

Heart Sounds in Young Adults.—Sacks and Roberts used the stethograph in determining the characteristics and time relationships of the heart sounds of 110 normal young adults (medical students) and the significance of systolic and diastolic vibrations, exclusive of the heart sounds themselves, occurring in the absence of audible murmurs. All records examined revealed a normal sinus rhythm, with the heart rate varying from 60 to 90 beats a minute. Sixty-eight records (61.8 per cent) showed vibrations during systole. These varied in number from four to twenty-six. Systolic murmurs were audible in ten instances (9 per cent) and examination of the stethograms of these subjects revealed that from sixteen to twenty-six systolic vibrations were present in every record. In the other fifty-eight cases in which there were systolic vibrations and no audible murmur, only twelve records resembled those obtained from the subjects with audible systolic murmurs. The inaudible systolic vibrations occurred more often in the asthenic type of individual. Early diastolic vibrations were present in fourteen cases (12.7 per cent). The maximal number of vibrations recorded was from eight to ten. In no instance was a diastolic murmur audible through the stethophones. The systolic vibrations found in the normal subjects with records of organic murmurs were compared with those found in fifty cases of organic heart disease in which there were obvious systolic and diastolic murmurs. In the majority of the cardiac cases an organic systolic or diastolic murmur was represented by from sixteen to forty-four vibrations. Thus it became clear that 20 per cent of the total normal group had from sixteen to twenty-six systolic vibrations that could not definitely be distinguished from the recorded murmurs of organic heart disease. However, the well defined organic murmurs usually had more vibrations and were of longer duration. The results suggest that, in the interpretation of stethographic records, systolic vibrations should not be regarded as actual murmurs unless there are at least sixteen regular oscillations. A few irregular oscillations in systole or diastole may be due to the impact of the apex against the wall of the chest or to other extracardiac factors.

American Journal of Cancer, New York

37:1-172 (Sept.) 1939

Myeloid Leukemia and Nonmalignant Extramedullary Myelopoiesis in Mice. W. A. Barnes and I. E. Sisman, New York.—p. 1.
Tumor Induction and Tumor Growth in Hypophysectomized Mice. R. Korteweg and F. Thomas, Amsterdam, Netherlands.—p. 36.
Lymphoblastoma in Mice Following Administration of Carcinogenic Tar. A. M. Brues and Berda B. Marble, Boston.—p. 45.
Relation of Vitamin B Complex to Tumor Growth. F. Bischoff and M. Louisa Long, Santa Barbara, Calif.—p. 54.
Properties of the Inhibitor Associated with Active Agent of Chicken Tumor I. A. Claude, New York.—p. 59.
*Evaluation of Risk of Biopsy in Squamous Carcinoma: Clinical Experiment. R. Paterson and J. R. Nuttall, Manchester, England.—p. 64.
Cytology of Tumor Cell in Rous Chicken Sarcoma. M. Levine, New York.—p. 69.
Effect of Anol on Growth of Mammary Gland. E. T. Gomes and C. W. Turner.—p. 108.
Experiments in Homologous Transmission of Lymphoblastic Leukemia in a Calf. J. Stamey, W. H. Feldman and W. C. Popp, Rochester, Minn.—p. 114.

Risk of Metastasis from Biopsy.—Paterson and Nuttall compared the incidence of metastases in patients with similar lesions but divided into two groups, in one of which biopsy was performed and in the other it was not. A number of conditions had to be met, which limited the choice of cases suitable for analysis. A type of tumor which habitually metastasized in a readily recognizable way was essential in order that the patients might be followed up in a routine clinical manner without requiring special examinations at each visit. The patients chosen suffered from malignant disease of the skin, mouth, lips and penis. The biopsy group included only squamous cell carcinoma. The study thus became one on the risk of biopsy in squamous carcinoma rather than a general study of biopsy risks. Early lesions of suitable type with no involvement of lymph nodes undergoing treatment by radium molds were alternately sectioned and not sectioned before application of the mold. The time between treatment and analysis varied between one and a half and four and a half years. Such an interval was considered to be long enough for metastases to appear if they were going to occur, though occasionally much greater intervals have been recorded. At the end of two years 202 cases had been listed. Thirty-six did not fulfil all the criteria. Of the remaining 166 cases, biopsies were done in ninety-nine and they were not done in sixty-seven cases. Of the group in which biopsy was done metastases developed in 19 per cent as compared with 20.5 per cent in the group without biopsy. This discrepancy is well within the limits of casual error of a limited sample. The number of patients less than 45 years of age is small, but it is interesting that no metastases occurred in this group. The incidence in the other two age groups (from 45 to 65 and more than 65) is reasonably equal. The fact that the percentages were fairly constant in all the subgroups the authors believe is an additional indication that the figures are representative and not accidental. The purity of the samples and the fact that the higher figure for metastases occurs in the group without biopsy provide substantial evidence against the belief that biopsy causes metastasis in any appreciable percentage of these (squamous carcinoma) cases.

American Journal of Public Health, New York

29:1083-1192 (Oct.) 1939. Partial Index

*Viruses of Equine and of St. Louis Encephalitis in Relationship to Human Infections in California, 1937-1938. Beatrice F. Howitt, San Francisco.—p. 1083.
Detection of Trichinella Infestation in Hogs by Intradermal Test. A. Lichterman and I. Kleeman, New York.—p. 1098.
Experimental Infection of Dermacentor Andersoni Stiles with Virus of Lymphocytic Choriomeningitis. H. J. Shaughnessy and A. Milzer, Chicago.—p. 1103.
The Physician's and Nurse's Part in Health Education. Dorothy Nyswander and M. Derryberry, Washington, D. C.—p. 1109.
Bacteriologic Tests on Mechanical Dishwashers for Home Use. W. E. Ward and G. M. Dack, Chicago.—p. 1114.
*Active Immunization Against Diphtheria: Efficacy of Several Methods Used in a City of Medium Size. F. K. Harder, A. Gelperin and W. R. Cook, Cincinnati.—p. 1119.
Similarity of Chronic Infections with Salmonella Typhimurium and Tuberculosis in Guinea Pigs. E. A. Birge, Madison, Wis.—p. 1125.
Meningococcic Meningitis in the District of Columbia. C. C. Dauer, Washington, D. C.—p. 1140.
*Occurrence of Atmospheric Lead Resulting from Use of Colored Blackboard Crayons. H. W. Ruf and W. Z. Pluck, Madison, Wis.—p. 1149.

Encephalitis Viruses in California.—Howitt reports that during the summer and autumn of 1937 physicians in California reported a number of cases of acute encephalitis, in some of which the course was stormy and in others less violent. There

were forty deaths. Most of the cases occurred in Fresno and Tulare counties. During the same seasonal period in 1938 a similar type of disease was recorded showing both the severe and the milder forms. Fresno and Tulare were again affected, with additional patients from Kern County. The western strain of the equine virus was recovered from the brain and the blood, respectively, in two cases. Both strains were shown to be immunologically and serologically similar to the virus of equine origin. Positive neutralization to the St. Louis virus was obtained in forty-nine (47.5 per cent) of 103 serums and positive neutralization to the equine virus (Br) in thirty-two (37 per cent) of eighty-six serums. Of a total of sixty-three apparently normal persons, contacts and noncontacts, residing in both the Bay Region and the San Joaquin Valley districts, eight had neutralizing substances for the St. Louis virus and one for the equine. With the exception of one for the St. Louis type, all of the group with positive reactions resided in the valley. Of a total of forty-seven persons tested for equine virus and sixty tested for the St. Louis strain among groups with a condition diagnosed as poliomyelitis in both regions, the only subjects with serums positive for either virus were residing in the San Joaquin Valley. Fourteen of twenty-one serums positive to the Br equine strain also gave strongly positive neutralization with the western virus of equine origin (Californian), while four were weakly positive. Neutralizing antibodies for the Br equine virus could be obtained as early as eight days after onset of the disease and were found in some persons one, two and even three years after recovery. The predominance of positive reactions for the St. Louis virus was among the older people, while that for the equine was among the younger. No definite relationship was noted between cases of the equine disease in horses and those in man. Swampy lands and many mosquitoes were closely associated with the districts affected. From the epidemiologic evidence it seems likely that the equine virus was transmitted to man through some vector. The St. Louis strain was brought in by the migrant labor population.

Active Immunization Against Diphtheria.—In a test survey for determining the efficacy of several methods of active immunization against diphtheria Harder and his associates compare the artificial and the natural immunity (as measured by the Schick test) of 544 noninoculated children, 208 receiving four injections of toxin-antitoxin, 735 given three injections of toxin-antitoxin, 650 given two injections of Ramon toxoid and 219 given one injection of alum-precipitated toxoid. The observations in the various groups were not exactly comparable because the intervals of time between administration of the various antigens and testing were not always the same. Nevertheless, it was possible to reach certain conclusions. Each of the groups of inoculated children showed a definitely higher level of immunity than the control group. This was particularly significant because the controls were older and therefore had a higher level of natural immunity. The relatively good results in the group that received one injection of alum-precipitated toxoid may have been due to the short interval of time between inoculation and testing (one year or less). The somewhat poorer results in the group given two injections of Ramon toxoid may have been due to the younger age of the members of this group or to the fact that they received only two injections one week apart. The results in the group which received toxin-antitoxin were relatively final and represented the resultant immunity status after primary stimulus and natural immunization had reacted over a substantial period of years (four to six). There was no significant difference between the immunity levels of those who received three and those who received four injections of toxin-antitoxin. The authors conclude that no actively immunizing agent provides perfect protection against diphtheria. This is not surprising as the disease itself does not provide complete protection against subsequent attacks. Diphtheria affects predominantly poor white children. In the control of the disease, the improvement of living and housing conditions is important.

Atmospheric Lead from Colored Blackboard Crayons.—Ruf and Fluck state that the Wisconsin State Board of Health was recently requested to analyze two samples of yellow blackboard crayons suspected of containing lead. The analysis showed they contained respectively 7 and 8.8 per cent lead. Subsequent discussions with school officials disclosed that yellow blackboard crayons were used extensively, especially in defective vision classes. The possibility of lead poisoning due to inhalation of lead dust during use of some of the colored crayons was investigated. Twenty-seven crayons obtained from six manufacturers were analyzed for their lead content. The crayons were obtained from various schools or school supply houses in Wisconsin without selection. In studies relative to the amount of crayon dust dispersed into the atmosphere under controlled and actual classroom conditions, atmospheric samples were collected at the breathing zone of the person writing and in the center of the room at a height corresponding to the breathing level of students. Data show that with use of 6.8 per cent lead crayons under controlled conditions, the concentration of lead in the air may at times exceed the 1.5 mg. of lead per ten cubic meters of air recommended by the United States Public Health Service as the maximal amount permissible for prolonged exposure. During a writing period of thirty minutes the amount of lead at the breathing zone of the person writing is dependent on the rate of crayon usage. During the writing period the lead was dispersed throughout the room air, but in all cases the concentration was below that at the blackboard. The maximal concentration of lead found in samples of air collected seventy minutes after writing ceased was 0.2 mg. per ten cubic meters of air. The results under classroom conditions agree with those of the controlled group in that ordinarily the concentration of lead in the air at the center of the room was below 1.5 mg. per ten cubic meters of air. However, under adverse conditions (when much crayon is being used or many students are writing) it seems reasonable to expect that higher concentrations of lead may occur. During one test, in which 13 Gm. of crayon was used in one hour's writing, the concentration of lead in the air at the blackboard was 5.9 mg. per ten cubic meters. Persons subjected to the greatest lead exposure are teachers and students writing at the boards and janitors cleaning boards, erasers and classrooms. As children appear more susceptible to lead intoxication than adults, the desirability of replacing lead chromate as a pigment is apparent. In addition to absorption of lead by inhalation, the danger of ingestion by nibbling pieces of crayon should not be ignored. The fact that at least one manufacturer has produced a yellow crayon free of lead shows that the hazard can be eliminated.

Am. J. Roentgenol. & Rad. Therapy, Springfield, Ill.

42: 321-480 (Sept.) 1939

Use of Intestinal Intubation in Localization of Lesions of Gastrointestinal Tract. J. E. Lofstrom and R. J. Norr, Detroit.—p. 321.
*Lymphosarcoma of Stomach: Diagnosis and Treatment. V. W. Archer and G. Cooper Jr., University, Va.—p. 332.
Liposarcoma of Mediastinum and Lung. C. W. Perkins, Norwalk, Conn., and R. F. Bowers, New York.—p. 341.
Compression of Spinal Cord in Osteitis Deformans (Paget's Disease) of Vertebrae. G. A. Schwarz, Hartford, Conn., and S. Reback, New York.—p. 345.
Anomalies and Variations in Normal Skull: From Roentgenologic Point of View. C. W. Schwartz, New York.—p. 367.
Medullary Artefacts in Prehistoric Bones. F. H. Decker and M. G. Bohrod, Peoria, Ill.—p. 374.
*Roentgen Therapy in Lymphogranuloma Venereum. J. I. Martin and A. A. de Lorimier, Washington, D. C.—p. 376.
Treatment of Mammary Cancer and Calculations of Dosages Delivered by Radiation Therapy. G. Beckstrand, Long Beach, Calif.—p. 389.
Further Observations on Carcinoma of Breast. E. P. Pendergrass and P. J. Hodes, Philadelphia.—p. 393.
Dental Lesions Observed After Roentgen Therapy in Cancer of Buccal Cavity, Pharynx and Larynx. J. A. del Regato, Washington, D. C.—p. 404.
*Roentgen Treatment of Lobar Pneumonia. L. Solis-Cohen and S. Levine, Philadelphia.—p. 411.
Roentgen Therapy of Cancer in Buccal Cavity and of Cervix Uteri. E. A. Merritt, Washington, D. C.—p. 418.

Lymphosarcoma of Stomach.—Archer and Cooper sent a questionnaire to all diplomates of the American Board of Radiology and asked that they cite all microscopically proved but heretofore unreported cases of these tumors. The information gleaned from this questionnaire reveals ninety-one cases and the authors add three of their own. In these ninety-four cases thirteen five year cures have been disclosed. In eight irradiation alone was used, in one only surgery and in four both surgery and irradiation. No single symptom or x-ray sign is pathognomonic of the growth, the diagnosis being practically impossible except possibly at operation, when a softer tumor than the usual carcinoma is felt. A frozen section will then be quite helpful. Enlarged rugae are not believed to play a

prominent part in x-ray diagnosis. Acid values may or may not be decreased. Healing of an ulcer does not eliminate the possibility of sarcoma.

Roentgen Therapy for Venereal Lymphogranuloma.—Martin and de Lorimier used roentgen therapy in sixty-one cases of venereal lymphogranuloma. Only one of the patients was a woman. In all but four the active processes concerned inguinal glands. In one of the four the involvement appeared primarily to have existed on the tongue and mucous membranes of the cheek and oral pharynx. The other three extragenital lesions were manifested by constrictions in the lower colon or rectum. Frei reactions were positive in forty-two of the patients. Twenty of these admitted that they had had some type of primary lesion and in most instances these were described as small ulcerations. The descriptions by the patient whose mouth and oral pharynx were involved indicated that herpetiform lesions had recurred at irregular intervals for about two years. The doses of roentgen radiation required varied. To avoid marked reactions the authors started treatment with as little as 50 roentgens. In cases showing little evidence of swelling or inflammation, 100 roentgens was given. When 50 or 100 roentgens was given, the interval between treatments was one week. When the dosage was increased to 200 roentgens the interval was increased to two weeks. Later, when 300 roentgens was applied the interval was increased to three weeks. In a few cases as much as 400 roentgens was given but the interval between treatments was never extended beyond three weeks. Roentgen irradiation was continued at intervals of from one to three weeks until the activity of the lesions subsided. Patients were not incapacitated for more than the first few weeks. Thereafter they were able to carry on their usual work. In approximately 60 per cent of the cases fistulous tracts developed either spontaneously or as a result of incisions made by the referring physician. In both instances, drainage stubbornly continued. The presence of the fistulous tracts seemed to add to the indications for roentgen therapy. The quality of roentgen rays was varied somewhat. In attacking the inguinal adenitis a kilovoltage of 140 was used. The filtration was of the equivalence of 6 mm. of aluminum, the half-value layer being obtained with 0.30 mm. of copper—a wavelength equivalence of 0.205 angstrom. The four extragenital cases were treated with a shorter ray. The portals of irradiation were reduced to the minimum. All treatments were given with the use of a cone whereby the focal skin distance was 37 cm. Unfavorable developments occurred in only two of the fifty-seven cases involving the inguinal glands. There have been no known recurrences of activity among the patients. The authors believe that venereal lymphogranuloma should be considered in cases of inguinal adenopathy, especially when the involvement is predominantly unilateral and when there is matting and tenderness of the glands. The presence of an ulcer about the genitalia should not designate the case as one of syphilis or Ducrey infection, though the possibilities must be considered. The development of multiple fistulous tracts from lymphatic glands should lead one to consider venereal lymphogranuloma. Smears and cutaneous tests should be made, as well as repeated serologic examinations. The Kahn test was positive in eight of the sixty-one cases. This condition should also be considered in cases of stubborn chronic granulomatous lesions in the mouth or oral pharynx, especially if such cases manifest a marked regional lymphadenitis and a tendency toward persistent formation of fistulous tracts. It should be considered in cases of annular or bandlike constrictions in the colon or rectum. Irradiation must be applied at intervals, protracted over a period of from one to three months. The glands as well as the sinus tracts should be irradiated.

Roentgen Treatment of Lobar Pneumonia.—Solis-Cohen and Levine irradiated twenty lobar pneumonia patients and found that if adults were treated in the department before the fourth day of the onset of the disease they recovered without complications. Adults treated at the bedside required more frequent treatments, and many more complications developed. Adults treated after the fourth day either with high voltage or at the bedside had a more severe course. The favorable syndrome (decreased fever, a feeling of comfort and an initial fall in leukocytosis) was experienced by all patients who recovered but not by the patients who died. Four adults died, two of whom were hopelessly ill prior to irradiation, and the corrected mortality is therefore 10 per cent. One of the twenty-two children irradiated died; bacteremia and a mastoiditis developed in this child. The course of the disease was more severe in children and adults who were not irradiated. In four irradiated adults the disease was practically aborted and crisis or lysis exhibited a tendency to occur earlier than in the nonirradiated patients. Oxygen tents were less often necessary for the irradiated patients. In the forty adults who received no irradiation, seven were treated with serum; two of these died, together with eight who did not receive serum. The death rate was 25 per cent. Fifteen of the recovered patients had a stormy course and there were major or minor complications in twenty of the series. Nine of the twenty adult patients received from 150 to 200 roentgens and eleven from 300 to 400 roentgens. Of the children, fifteen received from 200 to 300 roentgens and seven 150 roentgens. The death rate in the children given roentgen therapy was not influenced, as one of twenty-one nonirradiated children died; but the irradiated children were comfortable, complications did not develop and they passed through a less stormy course.

American Journal of Tropical Medicine, Baltimore

19: 425-496 (Sept.) 1939

Malaria Survey of Republic of Costa Rica, Central America. H. W. Kumm, San Jose, Costa Rica, and H. Ruiz S.—p. 425.
Malaria Mortality in the Southern United States for the Year 1937: Prepared for National Malaria Committee. E. C. Faust, New Orleans.—p. 447.
Anopheles Mattogrossensis from Venezuela with Description of the Male. A. Gabaldon, Caracas, Venezuela.—p. 457.
Varieties of Anopheles Crucians Wied. W. V. King, Washington, D. C.—p. 461.
Clinical Trichocephalus Trichiurus Infection: Analysis of Eighty-One Cases. J. C. Swartzwelder, New Orleans.—p. 473.
Enrichment of Culture Mediums for Endamoeba Histolytica. Gladys M. Craig, New York.—p. 483.

Annals of Surgery, Philadelphia

110: 481-800 (Oct.) 1939. Partial Index

Experiences with Total and Intracapsular Extirpation of Acoustic Neuromas. G. Horrax and J. L. Poppen, Boston.—p. 513.
Intracranial Arteriovenous Aneurysms. A. O. Singleton, Galveston, Texas.—p. 525.
Bowel Obstruction in the Newborn. E. M. Miller, Chicago.—p. 587.
Peptic Ulcers Perforating into Pancreas. J. S. Horsley, Richmond, Va.—p. 606.
Lateral Gastroduodenostomy in Certain Cases of Duodenal and Recurring Ulcer. V. C. Hunt, Los Angeles.—p. 622.
*Experimental Proof of Obstructive Origin of Appendicitis in Man. O. H. Wangensteen and C. Dennis, Minneapolis.—p. 629.
Value of Preliminary Colostomy in Correction of Gastrojejunocolic Fistula. D. H. Pfeiffer, Philadelphia; assisted by E. M. Kent, Norwich, Conn.—p. 659.
Sclerosing or Retractile Mesenteritis: Its Treatment and That of Adhesions with Electrosurgical Knife. F. L. Reichert, F. Gerbode and F. J. Halford, San Francisco.—p. 669.
*Liver Trauma and Hepatorenal Syndrome. T. G. Orr and F. C. Helwig, Kansas City, Kan.—p. 682.
Control of Postoperative Bleeding in Obstructive Jaundice. J. D. Stewart, G. M. Rourke and A. W. Allen, Boston.—p. 693.
*Significance of Cholesterol Partition of Blood Serum in Surgery of Gallbladder. O. C. Pickhardt, A. Bernhard and I. L. Kohn, New York.—p. 701.
Fibroma of Ovary with Ascites and Hydrothorax: Further Report. J. V. Meigs, Boston.—p. 731.
Effect of Distention of Colon and Stimulation of Its Nerve Supply on Flow of Bile from Liver. L. Goldman and A. C. Ivy, Chicago.—p. 735.

Obstructive Origin of Appendicitis.—Wangensteen and Dennis present evidence of the secretory capacity of the vermiform appendix of man. The behavior of the appendix when obstructed temporarily is described, and factual proof of the reproduction of the pathologic picture of spontaneous appendicitis through the agency of obstruction is presented. In a patient presenting a carcinoma of the ascending colon, it was possible to exteriorize the greater portion of the right half of the colon and the terminal ileum. A few days later, when the exteriorized intestine had become fairly well covered with fibrin and effectual sealing of the wound had occurred, the base of the appendix was ligated securely. The attachment of a closed water system connected to a recording manometer permitted determination of the ensuant increase in intraluminal pressure. When preliminary colostomy was being performed for a malignant condition of the large intestine or rectum prior to excision of the lesion, the appendix was exteriorized and obstructed. The

secretory activity of the obstructed appendixes is summarized. The highest recorded pressure was 126 cm. of water. This level was reached twenty-two hours after exteriorization and obstruction of the appendix of a man 68 years of age. No secretory pressure developed in three of the twenty-two exteriorized obstructed appendixes. In six other instances a secretory pressure of less than 20 cm. of water was recorded. In nine instances the highest secretory pressure exceeded 40 cm. of water; in seven of these the pressure was sustained above 85 cm. In four instances, pressures intermediate between 20 and 40 cm. of water attended obstruction of the exteriorized appendix. These data the authors believe support the thesis that in the vermiform appendix of man, when obstructed, a secretory pressure will develop in the majority of instances which will threaten the viability of the appendical wall. However, there are instances in which no evidence of secretory pressure attends luminal obstruction. Such appendixes undoubtedly would tolerate luminal obstruction without hazard. It appears likely that the chief inciting agency in bringing about appendicitis in man is obstruction of an appendix in which the mucosa (not atrophic) possesses the normal secretory capacity.

Liver Trauma and Hepatorenal Syndrome.—Orr and Helwig report five cases of hepatic injury associated with renal damage in all of which some degree of a toxic effect on the kidneys was shown by an increase in the blood of nonprotein nitrogen and creatinine and in the urine of albumin, pus and casts. In two cases there was postmortem examination. The changes in the blood and urine occur rapidly after severe hepatic injury. In less than twenty-four hours there was retention of nitrogen, and albumin, casts and frequently pus and erythrocytes were present in the urine. Helwig and Schutz observed these rapid changes in the blood and urine of dogs dying within twelve hours after the liver was traumatized. It is difficult to believe that infection is a factor in the hepatic and renal changes. The three patients operated on all had infected wounds, but the changes in the blood and urine were present before the infection developed. In case 2, general peritonitis was found at necropsy but the blood chemistry had returned to normal before death. It is believed that in this patient death was not directly due to the toxic effect of the hepatic trauma but was caused by the complicating infection. In case 1, the blood returned to normal although a severely infected wound and later an empyema developed, from which the patient recovered. Krieg has presented evidence which pointed to a toxic condition on an uninfective basis. From the clinician's standpoint the practical value of the observations on blood and urine incident to hepatic trauma are worthy of consideration. Although the nitrogen retention in the blood develops early after hepatic damage, the importance of early operation to control hemorrhage would negate the value of the changes in the blood and urine as a diagnostic aid in many cases. However, in those cases in which bleeding is slow and the condition of the patient warrants a delay of a few hours to establish the diagnosis of hepatic injury, the changes in the blood and urine may be of some diagnostic value. In case 2, operation was delayed for twenty-four hours, during which time the nonprotein nitrogen rose to 131 mg. and the creatinine to 4.1 per hundred cubic centimeters of blood. This patient had other injuries complicating the picture, but knowing that such blood changes are associated with hepatic damage aided in confirming the diagnosis of rupture of this organ. Frequent estimations of the nonprotein nitrogen and creatinine may be of definite value in the prognosis. Certainly an increase in nitrogen retention indicates an increase in toxicity. Delirium may be an outstanding symptom; it was observed in four of the cases reported. After a few days there develops a hemorrhagic tendency, similar to that observed in patients with jaundice. The treatment of severe hepatic trauma is the treatment of shock plus operation to control bleeding and administration of dextrose to maintain liver glycogen and promote diuresis. The quantity of sodium chloride given must depend to some extent on the quantity lost by vomiting. Usually the administration of chlorides is not an important factor in treatment.

Blood Cholesterol and Gallbladder Operations.—Pickhardt and his co-workers state that in normal persons the ratio of esterified to free cholesterol is a physiologic constant. Any alteration in this relationship indicates a disturbance in the ability of the liver to regulate the synthesis and hydrolysis of cholesterol esters. They believe that the liver has a functional reserve, which is reflected by changes in the cholesterol partition. A rise in the percentage of free cholesterol of the blood serum is indicative of a lowering of the functional reserve. They show that changes in the cholesterol partition are of clinical value in determining the functional reserve of the liver in hepatic disturbances associated with surgical therapy of the biliary tract and thus serve to indicate the optimal time for a planned surgical intervention. A patient who exhibits a low functional reserve of the liver is a poor operative risk. Medical treatment should be instituted, and repeated estimations of the cholesterol partition will indicate when the functional reserve has returned to normal. The cholesterol partition has prognostic value in surgical treatment of the gallbladder and biliary tract. The cholesterol partition of the blood serum should be determined both preoperatively and postoperatively for all patients with biliary disease and jaundice.

Archives of Internal Medicine, Chicago

64: 661-896 (Oct.) 1939

Reflex Coronary Artery Spasm Following Sudden Occlusion of Other Coronary Branches. G. W. Manning, C. G. McEachern and G. E. Hall, Toronto.—p. 661.
*Angina Pectoris in Hereditary Xanthomatosis. C. Müller, Ullevaal, Norway.—p. 675.
Chronic Leukemia: Early Phase of Chronic Leukemia, Results of Treatment and Effects of Complicating Infections: Study of Eighty-Six Adults. M. M. Wintrobe and L. L. Hasenbush, Baltimore.—p. 701.
Traumatic Rupture of Pericardium: Study of Twenty-Two Cases, with Two and One-Half Year Period of Survival in One Case: Review of Literature. S. F. Crynes and W. C. Hunter, Portland, Ore.—p. 719.
Experimental Renal Insufficiency Produced by Partial Nephrectomy: XIII. Summary of Effect of Whole Liver, Whole Meat, Extracted Liver and Extracted Meat Diets on Renal Hypertrophy, Renal Function, Blood Pressure and Cardiac Hypertrophy. A. Chanutin and S. Ludewig, University, Va.—p. 747.
Id: XIV. Diets Containing Whole Dried Yeast. A. Chanutin and S. Ludewig, University, Va.—p. 756.
Age, Sex and Hypertension in Myocardial Infarction Due to Coronary Occlusion. A. M. Master, S. Dack and H. L. Jaffe, New York.—p. 767.
Juvenile Diabetes Mellitus. W. H. Grishaw, H. F. West and B. Smith, Los Angeles.—p. 787.
Hyperthermia, Genuine and Spurious. W. J. MacNeal, New York.—p. 800.
Prolonged Hyperthermia: Report of Case with Necropsy. W. J. MacNeal, H. H. Ritter and S. M. Rabson, New York.—p. 809.
Multiple Myeloma Associated with Nodular Deposits of Amyloid in Muscles and Joints and with Bence Jones Proteinuria. L. Tarr and H. W. Ferris, New York.—p. 820.
Gastro-Enterology: Review of Literature from July 1938 to July 1939. C. M. Jones, Boston.—p. 834.

Angina Pectoris in Hereditary Xanthomatosis.—Hereditary heart disease due to xanthomatosis is fairly common. Müller believes that he has demonstrated it as a dominant factor in seventeen families, with seventy-six individuals affected. He divides the affected persons into three familial groups: the families in which xanthoma tuberosum and eventually palpebral xanthelasma occurred; the families with palpebral xanthelasma, and the families in which there were no changes in the skin or subcutaneous tissue but in which the cardiovascular disease occurred in combination with hypercholesteremia and in which postmortem observations or other factors suggested that xanthomatosis might be the main cause of the cardiovascular disease. The group consists of forty-four women and thirty-two men from 31 to 85 years of age, the average for the living members being 56.3 and for the deceased ones 60.9 years. Most of these persons were office workers or teachers. The laboring class was not represented. Of the seventy-six persons, sixty-eight appeared to have had heart disease, while eight had xanthelasma only. Of the sixty-eight persons, the diagnosis of angina pectoris seemed indicated in fifty-nine, of whom thirty-eight have died, fourteen suddenly. Of the seventeen family histories, in eight xanthoma tuberosum was encountered alone or combined with xanthelasma, in six there were records of xanthelasma only and in three there were no records of cutaneous changes. Cutaneous xanthomatosis in one form or another occurred in thirty-eight persons, xanthoma tuberosum in twenty-four and xanthelasma in fourteen; ten had the two forms at the same time. The quantity of cholesterol in the blood was estimated for thirty-seven patients; the amount varied from 129 to 560 mg. per hundred cubic centimeters. The reports presented confirm the previous observations on xanthomatosis as a cause of heredi-

tary heart disease. They reveal further that the syndrome of cutaneous xanthomatosis, hypercholesteremia and angina pectoris presents itself as a well defined clinical disease entity in the first, second, third and fourth generations, that is, as a dominant hereditary disease. There can be hardly any doubt but that xanthomatous deposits in the coronary artery and consecutive myocardial ischemia are the cause of the angina pectoris. The disease may cause changes in the mitral and aortic valves. The form of angina pectoris under discussion may occur in patients without external xanthomatosis. Data on two families illustrate that xanthomatosis may occur in a few members or only one member of a family, while relatives have heart disease and hypercholesteremia. In xanthomatosis, angina pectoris not only may occur at an early age with sudden death but more often appears as typical angina pectoris, lasting for years in middle-aged as well as in old persons; that is, it appears at the time that this disease usually occurs, from the sixtieth to the seventieth year or even later. In sixteen cases in the present series it commenced before the fiftieth year and in eight of these between the thirty-first and the fortieth year. Symptomatically this form of angina pectoris does not differ from the usual form. Xanthomatous cardiac lesions probably develop in persons who have no evidence of xanthomatosis in the skin. Xanthoma tuberosum and xanthelasma may be overlooked in clinical examinations and may be confused with other cutaneous conditions. The occurrence of heart disease in families should direct the attention to xanthomatosis, especially when rheumatic fever, syphilis and hypertension do not appear to play any part. Treatment of the cardiac symptoms in xanthomatosis does not differ from that of cardiac symptoms under other conditions. The patients are benefited by quiet, rest in bed and nitrites. A diet poor in cholesterol may be of prophylactic value to persons with a hereditary predisposition.

Archives of Otolaryngology, Chicago

30: 497-688 (Oct.) 1939

Surgical Treatment of Deafness. W. Hughson, Abington, Pa.—p. 497.
Further Experiments in Action of Drugs on Nasal Mucosa. A. W. Proetz, St. Louis.—p. 509
Blood Cultures in Cases of Otitic Sepsis. J. L. Goldman, New York.—p. 516.
Hay Fever Among Japanese: III. Studies of Atmospheric Pollen in Tokyo and in Kobe. H. J. Hara, Los Angeles.—p. 525.
Vertigo: Clinical Consideration. B. H. Shuster, Philadelphia.—p. 536.
*Climatic Factor in Mastoiditis. N. D. Fabricant, Chicago.—p. 549.
*Experiences with Sulfanilamide Therapy for Otogenous Infections, with Special Reference to Masking of Clinical Course. J. L. Maybaum, E. R. Snyder and L. L. Coleman, New York.—p. 557.
Origin of Quick Component of Labyrinthine Nystagmus. E. A. Spiegel, Philadelphia, and J. R. Price, Norristown, Pa.—p. 576.
Headache from Pathologic Changes in Nose or Other Causes: Differential Diagnosis. T. R. Gittins, Sioux City, Iowa.—p. 589.
Importance of Vestibular Findings Following Injury to Head. M. A. Zacks, Philadelphia.—p. 601.
Carcinoma of Trachea. A. M. Olsen, Rochester, Minn.—p. 615.
Paranasal Sinuses: Malignant Tumors. S. Salinger, Chicago.—p. 633.

Climatic Factor in Mastoiditis.—During 1938, ninety-two mastoidectomies were performed on children by the attending otologic staff of a pediatric hospital. Fabricant selected five cases from this group to illustrate the influence on the clinical course of the ailment of daily meteorologic and seasonal changes. Simplified meteorographs have been prepared from the United States government meteorologic data; for purposes of simplification the high and low range of daily temperature were regarded as an adequate index of meteorologic change. From the data obtained Fabricant concludes that mastoiditis is most often precipitated in the wake of a fall in atmospheric temperature (cold front or polar front), when the functional status of the mucous membranes of the nose and throat has changed.

Sulfanilamide Therapy for Otogenous Infections.—Because of its tendency to obscure the clinical course of the infection, Maybaum and his associates believe that sulfanilamide should be used cautiously if at all in acute otitis media. It is contraindicated during the course of suspected mastoiditis before operation and also after operation unless meningitis, sinus thrombosis or cerebral abscess complicates the disease. For the present, at least, they believe that the indications for its use are as follows: Sulfanilamide may be given in otitis media before suppuration sets in. However, otitis media of this type commonly proceeds to spontaneous resolution. Occasionally, in cases of extreme bacterial meningitis (streptococcic or pneumococcic), intensive administration is indicated before operation (twenty-four to thirty-six hours) and then postoperatively. Sulfanilamide should be given in sympathetic meningitis secondary to an extradural abscess, an abscess of the brain or labyrinthitis. In thrombosis of the lateral sinus sulfanilamide should be followed by thorough surgical intervention and continued postoperatively. The drug is especially useful in instances of continued otitic sepsis, even though a thorough operative procedure has been previously performed. In petrositis sulfanilamide should not be administered during the period of observation because of the danger of masking the clinical course and thus interfering with the proper management of the condition. If operation is indicated sulfanilamide should be given promptly in the usual manner. Indiscriminate use of sulfanilamide may result in latent forms of infection of the middle ear or the mastoid and their complications. That sulfanilamide tends to mask the clinical picture of otitic infection has been observed often. A striking example of latency due to the administration of sulfanilamide was recently reported by Smith and Coon, who stated that a moderate dose of sulfanilamide may partially control meningitis so that it presents an unfamiliar clinical picture.

Bulletin New York Academy of Medicine, New York

15: 639-716 (Oct.) 1939

Proteins as Chemical Substances and as Biologic Components. E. J. Cohn, Boston.—p. 639.
Origin and Developmental Potentialities of Blood Cells. C. A. Doan, Columbus, Ohio.—p. 668.
Curious Career of Typhoid Mary. G. A. Soper, New York.—p. 698.

Connecticut State Medical Society Journal, Hartford

3: 541-590 (Oct.) 1939

Valedictory. C. Barker, New Haven.—p. 541.
*Use of Insulin in Toxic Hallucinosis. H. W. McAdoo and C. T. Prout, Arlington, Mass.—p. 543.
Scoliosis: Rational Form of Treatment. C. W. Goff, Hartford.—p. 549.
Herniation of Intervertebral Disks. R. D. Padula, Norwalk, and R. C. Keys, Bridgeport.—p. 552.
Blood Transfusions: New Apparatus for Their Administration. J. H. Fine and R. M. Tovell, Hartford—p. 560.

Insulin for Toxic Hallucinosis.—On the basis of Sakel's explanation for the use of insulin in the treatment of morphine addiction, that is, "that insulin abolishes the phenomena of irritation during abstinence from morphine, because the nerve cells were blocked, and their function quantitatively affected," McAdoo and Prout began using insulin in eight cases of alcoholism associated with abnormal mental phenomena, particularly with hallucinosis. The subjects were selected from the consecutively admitted patients who presented evidence of hallucinatory phenomena of persistent nature which followed overindulgence in alcohol or which made their appearance after the withdrawal of alcohol. The hallucinations were, in most cases, both auditory and visual. The size of the dose of insulin varied from a minimum of 10 to a maximum of 25 units. The reaction (hypoglycemia) to dosage has been found to be extremely variable. A nursing personnel trained in the observation of patients receiving insulin therapy is absolutely essential. The repetition of dosage has been largely dependent on the needs of the individual, with a maximal frequency of every two and three-fourths hours. The largest number of treatments required was eleven, for a total dosage of 95 units, although 135 units were given in a smaller number of doses to another patient. The treatment was most satisfactory when it was continued for at least twenty-four hours after the hallucinations disappeared. The effect of the injections was largely sedative, with definitely and progressively decreasing evidence of severity in the reaction of the patient to the hallucinations. The most striking observation is that during the hospital residence the average total duration of the hallucinations in the treated series (143.6 hours) is definitely less than that in the untreated series (306 hours). On subtracting the average number of hours of active hallucinosis in the hospital prior to treatment with insulin from the total hours of hallucinosis in the hospital in the untreated series a still greater and even more striking contrast is obtained. The average figure for continued hallucinations following the institution of insulin therapy in the treated series was 50.4 hours,

as compared with 115 hours in Piker and Cohn's series of cases in which they used spinal puncture, dextrose and paraldehyde, and with 79.2 hours for untreated patients and 31.2 hospital hours for patients treated with insulin cited by Robinson.

Indiana State Medical Assn. Journal, Indianapolis

32: 557-598 (Oct.) 1939

Tuberculosis Outlook. P. H. Becker, Crown Point.—p. 557.
*Tuberculosis After 45 in Indiana. F. L. Jennings, Indianapolis.—p. 559.
Classification of Hypertension. I. H. Page, Indianapolis.—p. 562.
Subacute Bacterial Endocarditis Presenting Some Surgical Considerations: Case. J. R. Phillips, Michigan City.—p. 563.
Diagnosis and Results of Treatment of Toxic Goiter. N. W. Gillette, Toledo, Ohio.—p. 565.
Cesarean Operation in Relation to Maternal Mortality. G. B. Jackson, Indianapolis.—p. 570.
Cesarean Section: Analysis of 127 Consecutive Cases. L. W. Elston and R. W. Elston, Fort Wayne.—p. 572.

Tuberculosis After 45 in Indiana.—According to Jennings, a general impression held by the medical profession and the laity is that tuberculosis among older people is almost nonexistent. While it is true that a greater number of persons less than 45 years of age die of tuberculosis the difference is not so great that this erroneous idea is justified. Although there has been a definite decrease in the total number of deaths from tuberculosis in persons more than 45 years of age, further analysis of these figures shows that the proportion in this age group when considered in relation to the total number of deaths for all ages has not decreased; in fact, there has been a slight increase. In the state of Indiana there has been a gradual increase in this percentage. In 1938, 45.2 per cent of all the tuberculosis deaths in the state occurred in persons in this age group. In 1933 and again in 1938, 50 per cent of all the male tuberculosis deaths occurred in men 45 or more years of age. The percentage increase in deaths due to tuberculosis has exceeded the percentage increase in population of persons more than 45 years of age. Persons in this age group undoubtedly act as potential spreaders of the tubercle bacilli.

Iowa State Medical Society Journal, Des Moines

29: 479-536 (Oct.) 1939

Some of the Problems Confronting the Medical Profession. I. Abell, Louisville.—p. 479.
Hypersensitivity as Factor in Chronic Monila Vaginitis. R. E. Trussell, Iowa City.—p. 485.
Improved Method of Indirect Blood Transfusion. D. C. Sharpe, Dubuque.—p. 489.
Hydronephrosis Resulting from Ureteropelvic Obstruction. L. E. Pierson and E. M. Honke, Sioux City.—p. 491.
Treatment of Fractures of Spine. H. R. Conn, Akron, Ohio.—p. 495.
Patellaplasty: Partial Excision of Patella. L. J. Miltner, Davenport. —p. 502.
Nerve Deafness. J. A. Downing, Des Moines.—p. 503.

Johns Hopkins Hospital Bulletin, Baltimore

65: 291-352 (Oct.) 1939

Differentiation of Myeloblasts from Lymphoblasts by Their Manner of Locomotion: Motion Picture Study of Cells of Normal Bone Marrow and Lymph Nodes, and of Leukemic Blood. A. R. Rich, M. M. Wintrobe, Baltimore, and Margaret R. Lewis, Washington, D. C. —p. 291.
Activity of Lymphocyte in Body's Reaction to Foreign Protein, as Established by Identification of Acute Splenic Tumor Cell. A. R. Rich, Baltimore; Margaret R. Lewis, Washington, D. C., and M. M. Wintrobe, Baltimore.—p. 311.
*Transient Paralysis from Postural Hypotension. H. M. Thomas Jr., Baltimore.—p. 329.
Note on Reactions of Mouse Uterus to Ovariectomy in Presence of X Zone. Evelyn Howard, Baltimore.—p. 341.

Transient Paralysis from Postural Hypotension.—Thomas reports the case of a 65 year old man who has had innumerable attacks of transient paralysis of the right arm and leg and occasional blurring of vision of the left eye. These symptoms were reproduced by raising the patient on a tilting table from the flat to a 75 degree erect posture, at which time his blood pressure fell momentarily from 130 mm. of mercury systolic and 88 diastolic to 82 systolic and 55 diastolic or even lower. The paralysis passed in five or ten minutes with absolutely no residuum. The author believes that this apoplexy is caused by a fleeting localized cerebral ischemia which occurs in the course of a decrease in blood pressure from postural hypotension. The degree of narrowing of the lumen from arteriosclerosis of the various cerebral vessels determines the point at which the ischemia first produces symptoms. So sudden is the paralysis in the leg that the patient falls to the ground if he is not clinging to a chair or some other object for support. Stimulation of a hypersensitive carotid sinus may cause a sudden lowering of the blood pressure, but it is suggested that in this patient the postural hypotension is associated with an insensitive reflex pressor mechanism rather than with a hypersensitive reflex depressor mechanism. The occurrence of transient dimness of vision in one eye may be explained by the calcified bodies observed in a roentgenogram of the region of the internal carotid artery, which strongly suggest advanced sclerosis of this vessel. The physiologic explanation has served in this case as a basis for treatment. Treatment designed to prevent excessive drops in blood pressure has greatly diminished the number and severity of the attacks.

Journal-Lancet, Minneapolis

59: 419-470 (Oct.) 1939

Maternal Care: Introduction. F. L. Adair, Chicago.—p. 419.
Maternal Mortality in North Dakota. J. H. Moore, Grand Forks, N. D. —p. 420.
Postgraduate Education in North Dakota. J. L. Conrad, Jamestown, N. D.—p. 427.
Toxemias of Late Pregnancy. N. R. Kretzschmar, Ann Arbor, Mich. —p. 428.
Child and Maternal Health Program in South Dakota. M. W. Pangburn, Miller, S. D.—p. 432.
Prophylaxis of Puerperal Sepsis. R. D. Reekie, Spokane, Wash.—p. 434.
Maternal and Infant Mortality in Montana. F. L. McPhail, Great Falls, Mont.—p. 438.
Third Trimester Bleeding. G. A. Carmichael, Butte, Mont.—p. 441.
Care of the Healthy Baby. E. A. Hagmann, Billings, Mont.—p. 445.
Injuries to the Newborn. L. R. Alderson, Missoula, Mont.—p. 449.
Use of Elimination Diets in Allergy of Childhood. A. V. Stoesser and Eileen Hanson, Minneapolis.—p. 452.
Human Serum and Specific Agents in Treatment of Acute Meningitides. W. S. Sako, E. C. Perlman and E. S. Platou, Minneapolis.—p. 457.

Journal of Nervous and Mental Disease, New York

90: 429-568 (Oct.) 1939

Progressive Interstitial Hypertrophic Neuritis. P. Sloane, Philadelphia. —p. 429.
Metrazol Seizure and Its Significance for Pathophysiology of Epileptic Attack. H. Strauss, C. Landis and W. A. Hunt, New York.—p. 439.
Hysterical Amnesia Relieved by Induced Convulsions: Case Report. G. S. Ingalls, Cincinnati.—p. 453.
Significance of Infantile Sucking for Psychic Development of Individual. Margarethe A. Ribble, New York.—p. 455.
Blood Lipoids in Dementia Praecox and During Insulin Shock Therapy. M. Gerundo and W. W. Corwin, Topeka, Kan.—p. 464.
Genesis of Case of Paranoid Dementia Praecox. C. Brenner, Boston. —p. 483.
Convulsive Therapy in Psychoses. R. S. Bookhammer and E. Saxe, Norristown, Pa.—p. 489.

Journal of Pediatrics, St. Louis

15: 317-468 (Sept.) 1939

Malignant Tumors in Childhood. H. W. Dargeon, New York.—p. 317.
Malignant Tumors of Bone in Children. B. L. Coley, New York, and R. L. Peterson, Coeur d'Alene, Idaho.—p. 327.
Lymphomas, Leukemias and Allied Disorders in Children. L. F. Craver, New York.—p. 332.
Cancers of Genito-Urinary Organs in Children. A. L. Dean, New York. —p. 340.
Gynecologic Cancer in Children. J. A. Kelly, New York.—p. 354.
Cancer of Head and Neck in Children. H. E. Martin, New York.—p. 363.
Tumors of Soft Somatic Tissues in Infancy and Childhood. G. T. Pack and T. J. Anglem, New York.—p. 372.
Blood and Lymph Vessel Tumors in Children. W. L. Watson, New York.—p. 401.
*Acute Appendicitis in Childhood: Statistical Study of 848 Cases from the Children's Hospital, Boston. H. W. Hudson Jr. and J. W. Chamberlain, Boston.—p. 408.

Acute Appendicitis in Childhood.—Hudson and Chamberlain studied the clinical records of the 848 patients with acute appendicitis and its complications admitted to the Children's Hospital, Boston, between Jan. 1, 1929, and Dec. 31, 1938. Records of incidental appendectomy, interval operations for chronic and recurrent appendicitis, exploration for ill defined abdominal pain and diagnostic errors are not included. The different types of acute appendicitis studied were characterized by unruptured appendix without fluid (323 cases), unruptured with fluid (143 cases), ruptured with local peritonitis (149 cases), ruptured with abscess (155 cases), ruptured with diffuse or spreading peritonitis (sixty-eight cases) and an appendix which the surgeon described as showing no gross evidence of acute inflammation but which on microscopic examination was

found to be acutely inflamed (nine cases). The correlation of appendicitis with infections of the respiratory tract was attempted but was not demonstrated. Oxyuris vermicularis infestation as a cause of acute inflammation was infrequent, but there appeared to be a clinical syndrome indistinguishable, with safety, from appendicitis produced by such infestation. There was no definite evidence that fecaliths initiate acute appendical inflammations. The symptoms, signs and changes in the peripheral blood were sufficiently consistent to make diagnosis before perforation possible even in the very young. The triad of abdominal pain, vomiting and slight fever must be considered presumptive evidence of acute appendicitis, and frequent, gentle and painstaking examinations should be made during the first twelve hours of illness to corroborate or disprove such a diagnosis. The general policy, with but few exceptions, has been immediate operation irrespective of the type of appendicitis. Operation was delayed only when parenteral fluids were indicated. Primary appendectomy was performed in 95 per cent of the cases. A rectus-retracting or muscle-splitting incision was generally used. A drain or drains were introduced in the presence of peritonitis and often in the presence of fluid not definitely purulent. Duodenal drainage, parenteral administration of fluid and morphine were used liberally. A high oxygen atmosphere was maintained in the presence of distention. Fowler's position and the application of heat to the abdominal wall were employed in the majority of cases. The mortality rate was 3.06 per cent (twenty-six deaths in 848 cases). The authors believe that the factors affecting the mortality rate were, in the order of their importance, (1) the type of appendicitis present at the time of admission, which in turn is governed by the duration of the attack before diagnosis and the age of the patient, (2) the treatment employed, (3) coexistent disease and (4) the age of the patient. There need be no inherently high mortality rate based on age alone provided that a diagnosis is made comparatively early and the young patient is treated wisely. Figures are presented which demonstrate the continued need for lay education and, to a lesser extent, for reemphasizing the problem to the medical profession.

Laryngoscope, St. Louis

49: 739-876 (Sept.) 1939

Otogenic Complications: Résumé and Discussion of Literature for 1938. L. G. Richards, Boston.—p. 739.
Progress of Deafness in Clinical Otosclerosis. C. C. Bunch, St. Louis. —p. 793.
Frequency of Increased Nystagmus Time After Rotation in Multiple Sclerosis. P. Northington, New York.—p. 810
Survey of Use of Sulfanilamide in Acute Otitis Media. K. M. Houser, Philadelphia.—p. 825.
Skull Fractures Involving the Ear: Clinical Study of 211 Cases. W. E. Grove, Milwaukee.—p. 833.
Report of the Chicago Committee on Otogenic Meningitis, 1939. A. Lewy, Chicago.—p. 871.

Maine Medical Association Journal, Portland

30: 247-278 (Oct.) 1939

Small Community Hospital as a Teaching Hospital. J. T. Morrison, New York.—p. 247.
Bleeding During Pregnancy. C. P. Sheldon, Boston.—p. 254.
Endometriosis of Vagina: Case Report. W. F. W. Hay, Portland. —p. 260.
Diabetes Innocens. E. R. Blaisdell, Portland.—p. 264.

Missouri State Medical Assn. Journal, St. Louis

36: 383-426 (Oct.) 1939

Combined Use of Typhoid Vaccine and Neoprontosil in Treatment of Gonococcic Arthritis. R. O. Muether and K. R. Andrews, St. Louis. —p. 383.
Acute Putrid Lung Abscess. L. H. Pollock, Kansas City.—p. 387.
Relation of Urinary Tract to Obscure Abdominal Symptoms. K. D. Dietrich, Columbia.—p. 393.
Physiologic Actions Producing Common Clinical Symptoms of Hypothyroidism. V. H. Bergmann, Kansas City.—p. 399.
Improved Treatment of Cervicitis by Copper Ionization. J. J. Bredall, Perryville.—p. 403.
Role of Ellis Fischel State Cancer Hospital in Control of Cancer. F. J. Taussig, St. Louis.—p. 407.
Incidence and Mortality of Acute Poisonings. V. E. Friedewald, St. Louis.—p. 411.
Trochanteric Fractures of Femur: New Type of Ambulatory Cast for Treatment. S. M. Leydig, St. Louis.—p. 413.
Rocky Mountain Spotted Fever and Typhus Fever Occurring in Missouri. C. T. Herbert, Cape Girardeau.—p. 415.

New Jersey Medical Society Journal, Trenton

36: 569-632 (Oct.) 1939

Selection of Cases of Peptic Ulcer for Surgery. H. S. Read, Atlantic City.—p. 573.
Macrocytic Anemia. S. J. Penchansky, Bayonne.—p. 577.
Cardiac Pain. F. A Alling, Newark.—p. 581.
Infant Feeding. R. E. Wright, East Orange.—p. 586.
Criteria of Tuberculous Activity in Children Having Positive Tuberculin Test. E. H. Nickman, Atlantic City.—p. 587.
*Standards of Immunization Against Diphtheria. L. C. Rosenberg, Newark.—p. 591.
Common Colds. Y. Kneeland Jr., New York.—p. 595.
*Glucose Tolerance Test in Recurrent Infectious Intertrigo. C. C. Carpenter, Summit.—p. 597.
Functional Disorders of Colon. S. W. Johnsen, Passaic.—p. 599.
Experiences in Diagnosis with Peritoneoscope: Indications for Its Use. C. A. Beling, Newark.—p. 602.
Cord Lesions in Pernicious Anemia. A. F. Dowd, Newark.—p. 605.

Standards of Immunization Against Diphtheria.—This report, Rosenberg explains, expresses the conclusions of the Committee on Child Health regarding a standard uniform method which a family doctor can follow in immunizing children against diphtheria. Health officials advocate immunization of children at about 9 months of age, followed by Schick retesting on their entering school, and the administration of another cycle of immunizing injections to children who have lost their immunity. This is probably the most logical plan. This procedure would be similar to that adopted in various European countries for vaccination against smallpox, the first vaccination being done in infancy and a second on entering school. While the last word on the subject has not yet been written, the following procedure, in the opinion of various health officers, is recommended: to use the plain toxoid as the material of choice; to give a minimum of two injections, although three are preferable; to begin the injections at about the age of 9 months; to check this immunity four months later by a Schick test; to retest the children on entering school as to the persistence of their immunity, and to reinoculate the children found to have lost their protection.

Dextrose Tolerance Test in Recurrent Infectious Intertrigo.—Carpenter suggests that the carbohydrate metabolism should be determined in any person who has a chronic relapsing form of intertrigo so that if there is any defect it will be known. A simple test for blood sugar is not sufficient, for it may be within normal bounds. Campbell, in studying sugar metabolism of patients with pruritus, outlined a form of dextrose tolerance test which would indicate an abnormally delayed assimilation of carbohydrates. He gave orally 100 Gm. of dextrose on an empty stomach, and then took blood sugar readings one-half, one, two and two and a half hours after its administration. If the average result of these tests is more than 120 mg. per hundred cubic centimeters, he considers that an abnormal delay is present and that carbohydrate dietary restrictions should be enforced. In addition, in a few selected cases insulin may be necessary, in low dosages, until the acute manifestations are under control. No rational plan can be laid out for local treatment, but persistence and patience are indispensable.

New York State Journal of Medicine, New York

39: 1817-1898 (Oct. 1) 1939

Role of Posture in Chronic Arthritis. H. H. Jordan, New York.—p. 1823.
Reduce Head Injury Mortality. F. W. Geib, Rochester.—p. 1832.
Can Syphilis Exist Apart from Sex? E. H. Hudson, Clifton Springs. —p. 1840.
Treatment of Colonic Diverticulitis. T. E. Jones, Cleveland.—p. 1846.
Discussion of Some Bronchoscopic Problems. H. E. Boxer, Buffalo.—p. 1852.
Wilms' Tumor: Report of Case. J. H. Sheldon and J. W. Canaday, Glens Falls.—p. 1857.
Problem of Anemia: Some General Considerations. E. G. Allen, Syracuse.—p. 1861.
Coarctation of Aorta. D. W. Ingham, Washington, D. C.—p. 1865.
Value and Use of Urinary Antiseptics. F. J. Parmenter, Buffalo.—p. 1871.
*Bulgarian Belladonna Treatment of Chronic Encephalitis: Preliminary Report. Josephine B. Neal, New York.—p. 1875.
Bracelet Dermatitis. O. L. Levin and H. T. Behrman, New York. —p. 1877.

Bulgarian Belladonna for Chronic Encephalitis.—Neal used a white wine extract of the root of Bulgarian belladonna or tablets prepared from this extract in the treatment of seventy-five patients with chronic encephalitis; in most instances they

had been in that stage for ten years or more. Different lots of the extract average about 2.3 decimilligrams of total alkaloids per cubic centimeter and the tablets from 3.1 to 3.5 decimilligrams. In two or three cases there was a question as to whether the parkinsonism was on an arteriosclerotic or encephalitic basis, and in two there was an outstanding psychogenic factor. The patients continued to live in the same environment and under the same conditions as they previously had. They took no other drugs. No special diet was advised. It was recommended that they abstain from alcoholic beverages. The patients were usually started on a dose of 2 cc. of the decoction, or one tablet, taken just before retiring. This dose was increased daily by 1 cc. of the decoction or by one tablet until there was rather marked dryness of the mouth or blurring of vision. None of the patients showed mental confusion. The optimal dose varied between a minimum of from 4 to 8 cc. of the decoction (or the equivalent of the alkaloidal content in tablet form) and a maximum of from 30 to 50 cc. Some patients prefer taking the entire dose just before retiring; others prefer to take the total dose in divided portions. It is most important that these patients be under close medical supervision until the optimal dose is established and under frequent medical observation thereafter. In general, the decoction and the tablets were equally effective. Of the seventy-five patients 22.67 per cent were slightly improved, 48 per cent were moderately improved and 29.33 per cent were greatly improved. Practically all of the patients showed subjective improvement. They felt stronger, were less drowsy during the daytime and rested better at night; they were less tense, more cheerful and less given to fits of depression. Objectively, there was some relaxation of the muscular rigidity. This was shown in an improved facial expression, greater ease in rising from a sitting position, a more normal gait and improvement in speech. In practically all cases salivation was entirely relieved. The profuse perspiration from which a few patients suffered was also definitely diminished. While oculogyric crises usually became less frequent, less severe and shorter in duration, in no instance in the group have they been abolished completely. One case of narcolepsy following encephalitis, of many years' duration, has been improved in a short time, although the results with ephedrine and benzedrine were unsatisfactory.

Northwest Medicine, Seattle

38: 317-362 (Sept.) 1939

Important Factors in Control of Tuberculosis. L. P. Anderson, Elma, Wash.—p. 321.
Essential Factors in Diagnosis of Tuberculosis. F. S. Miller, Spokane, Wash.—p. 324.
Roentgen Examination in Diagnosis of Pulmonary Tuberculosis. F. B. Exner, Seattle.—p. 327.
Value of Tuberculin Test in Tuberculosis Work. S. L. Cox, Seattle.—p. 329.
Differential Diagnosis of Pulmonary Tuberculosis. P. Schonwald, Seattle.—p. 331.
Erythrocyte Sedimentation Test in Tuberculosis. E. G. Bannick, Seattle.—p. 334.
Case Finding in Tuberculosis. J. E. Nelson, Seattle.—p. 336.
Medical Treatment of Tuberculosis. L. G. Woodford, Everett, Wash.—p. 338.
Collapse Therapy in Pulmonary Tuberculosis. R. C. Matson, Portland, Ore.—p. 340.
Diagnosis and Treatment of Intestinal Tuberculosis. G. C. Bellinger, Salem, Ore.—p. 344.
Relationship Between Silicosis and Tuberculosis. C. H. Vrooman, Vancouver, B. C.—p. 346.
Diagnosis and Treatment of Bone and Joint Tuberculosis. J. F. Le Cocq, Seattle.—p. 349.

Virginia Medical Monthly, Richmond

66: 575-640 (Oct.) 1939

Herniation of Intervertebral Disk and Associated Lesions: Report of Cases. H. L. Skinner, Baltimore, and J. T. Rountree, Woodstock.—p. 575.
Body Weight and Hemoglobin Concentration. C. R. Spealman, Richmond.—p. 591.
Anomalies of Female Generative Organs: Report of Rather Remarkable Case. P. S. L. Moncure, Norfolk.—p. 593.
Preliminary Report on Dr. Alexander Finikoff's Treatment for Surgical Tuberculosis: Summary of Fourteen Cases. C. H. Dawson, Suffolk.—p. 575.
Pediatric Endocrinology. C. P. Mangum, Richmond.—p. 605.
Obstetric Amnesia, Analgesia and Anesthesia: Special Attention to Their Efficiency and Safety to Mother and Child. C. W. Dorsey, Roanoke.—p. 607.
Intestinal Obstruction. C. H. Lupton, Norfolk.—p. 610.
Intra-Abdominal Hernia. W. A. Johns, Richmond.—p. 620.
Placenta Praevia. V. E. Lascara, Norfolk.—p. 623.
Chemistry of Intelligence. E. Podolsky, Brooklyn.—p. 625.
John Snow's Work on Cholera. W. A. Preston, Richmond.—p. 628.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2: 671-712 (Sept. 30) 1939

Estrogenic Hormone Therapy. T. N. A. Jeffcoate.—p. 671.
Glomangioma: Form of "Painful Subcutaneous Tubercle." A. C. Lendrum and W. A. Mackey.—p. 676.
Electrosurgical Obliteration of Gallbladder Without Drainage (Thorek's Operation). H. Bailey and R. J. M. Love.—p. 682.
Urethrography: Technic, Interpretation and Utility. J. Kemble.—p. 683.
Generalized Actinomycosis with Predominant Spinal Symptoms, Including Collapse of Vertebra. G. J. Dixon.—p. 686.

Lancet, London

2: 723-772 (Sept. 30) 1939

*Personal and Clinical History in Hematemesis and Perforation. D. T. Davies and A. T. M. Wilson.—p. 723.
Hemorrhage in Peptic Ulcer: Review of 241 Consecutive Cases. J. G. Graham, J. C. Alexander and J. D. O. Kerr.—p. 727.
*Late Sequelae of Pulmonary Embolism. T. H. Belt.—p. 730.
Duration of Labor in Primiparas. Violet Spiller.—p. 733.
Blood Complement in Acute Glomerulonephritis and Toxemia of Pregnancy. S. Thomson, W. M. Arnott and G. D. Matthew.—p. 734.
Hematuria During Treatment with Sulfapyridine. T. C. Backhouse.—p. 736.
Lobsters and Gastro-Enteritis: Some Experiments on Cooking and Sterilization. H. M. R. Jones.—p. 738.

Hematemesis and Perforation.—Davies and Wilson call attention to the nervous influences which in certain personality types seemingly play a part in precipitating hematemesis and perforation. They record observations made both on the predisposing factors which long antedated gastric symptoms and on the external events which preceded the catastrophe. The investigations were made on fifty patients recovering from hematemesis and on twenty-five convalescent from an operation for a perforated ulcer. Regarding the fifty patients with hematemesis it was found that the precipitating events classified themselves most readily in relation to money matters, to the nature of their work and to serious illness of near relations, with a small residue of miscellaneous disturbances. Among the patients with perforation they discovered much the same personality types and precipitating situations. As in the hematemesis group, they found that the majority, sixteen of twenty-five, showed some acute episode in their lives which preceded the perforation by a few days. In nine, however, although no such events were found, symptoms of long-standing emotional stress were observable. The fact that events capable of producing unusual emotional tension were found to precede hematemesis and perforation in sixty-three of seventy-five patients appears to provide the evidence that the nervous system does play an important part in their etiology. The authors point out that patients often remark on their improvement after one of these catastrophes. The evidence points to a rapid healing following these major complications of ulcer. Does this fit in with the nervous origin of ulcer? As the authors show in their examples, these patients are harassed and worried by their responsibilities and by environmental changes. When there is acute uncertainty whether they can get through a situation or not, to give in, to resign and admit defeat is incompatible with their makeup. But when blood is vomited there is a sudden change in affairs. Their threatened failures are expiated. Urgent treatment is called for, and all other events become relatively unimportant. Wounded in the battle of life, they have an armistice and with it the possibility of a new orientation. The cares and worries of yesterday now seem relatively unimportant. It may be that this attitude of mind, this new outlook, does play some part in the good results which follow such urgent complications. If the view of the etiology of peptic ulcer implicit in these observations is accepted, there are corollaries in designing treatment. Practical therapy should include an attempt at prevention of these complications. In known ulcer patients avoidance of increased responsibility or of sudden changes in responsibility and encouragement of a more even life may help in the right direction, and during unavoidable stress and anxiety the frequent buffering of hyperacidity is rational. But in prevention by far the most important point is to convince the patient that his mind is capable of bringing distress to his stomach. Once the patient accepts this relation he can, the authors think, do much to put his house in order.

Late Sequels of Pulmonary Embolism.—Belt shows that pulmonary embolism is rarely regarded as the cause of chronic disease. Yet a careful study of the pulmonary arteries at necropsies makes it clear that sometimes it is necessary to reckon with long-standing lesions and morbid processes which appear to be the result of emboli lodged in the lungs months or even years before death. For want of a better term, the condition which the author describes may be called "chronic embolization of the pulmonary arteries." He has collected four representative cases which illustrate the progressive phases of this morbid process. The first patient, a man aged 28, sustained an injury on his left knee; the wound became infected, and the thigh had to be incised for the drainage of pus. Thereafter he had recurrent attacks of pulmonary embolism with pleuritic pain and bloodstained sputum. There were several episodes of increasing severity before the fatal seizure five months after injury. The necropsy revealed evidence of congestive heart failure, old and recent emboli of the pulmonary arteries and old and recent thrombosis of the left iliac veins. The author says that migration of venous thrombus to the lungs is seldom confined to a single event but tends to recur. This case is an example of recurrences over a period of three or four months. The emboli apparently arose from a subclinical thrombosis of the left internal and common iliac veins. This thrombosis was probably a sequel to the injury of the left leg. The second patient, a woman of 77, had recurrent attacks of pleural pain and weakness. She was treated for coronary disease and bronchopneumonia, and several weeks later she suffered two sudden painless attacks of faintness and suffocation. She died with congestive heart failure. The necropsy revealed that practically all the secondary branches of the pulmonary arteries were occluded with old and recent emboli which had arisen from a silent thrombus in the right external iliac vein. There were several small hemorrhagic infarcts of the lungs with associated pleurisy. In the third case the necropsy revealed cor pulmonale with chronic vascular congestion of viscera; fibrous stenosis of the pulmonary arteries, possibly due to organized emboli, and scarring and trabeculation of the left femoral and popliteal veins. The author emphasizes that the lesion which is regarded as an organized embolus is not necessarily static. There may be microscopic deposits of secondary thrombus on its surfaces. These tend to recur and undergo organization, somewhat like the verrucose vegetations of rheumatic heart disease, and may lead to progressive scarring; or there may be extensive development of secondary thrombus, as in case 4. In this latter case necropsy revealed cor pulmonale, old scarring of pulmonary arteries, recent emboli of the tertiary branches and a large plaquelike thrombus of the right main branch. The emboli had arisen from leg veins, which showed old and recent thrombosis. The clinical picture was not unlike that of Ayerza's syndrome. The extensive scarring of the larger pulmonary vessels probably dated back six years to a serious illness. The fatal issue was determined by embolism. The large plaquelike thrombus, which half filled the right pulmonary artery, had its roots in an old scar. It is not difficult to see how such scars as these might result from the organization of large emboli. The author stresses that, if watched for, many emboli of the lungs are seen in routine necropsies; these emboli for the most part are undiagnosed clinically. On the other hand, so few cases of primary thrombosis are seen that, when it comes to deciding between primary thrombosis and embolism, the author always thinks of embolism first, though this is not the common teaching. In all of the reported cases he proved a potential source of embolism. He thinks that if his interpretation is correct, recurrent embolism is a possible cause of chronic pulmonary obstruction and cor pulmonale. Moreover, he believes that some cases of Ayerza's disease may perhaps be explained on this basis.

Tubercle, London

20: 533-572 (Sept.) 1939

Effects of Varying Degrees of Allergy in Experimental Tuberculosis. C. Clayson.—p. 533.
Silicosis in Slate Quarry Miners. T. W. Davies.—p. 543.
Tuberculosis in Man Due to Bovine Type of Tubercle Bacillus in the Netherlands. A. Charlotte Ruys.—p. 556.
Cutaneous Test for Tissue Reactions in Animals with Dusts Causing Pneumonokoniosis. S. R. Gloyne.—p. 561.

Archives de Médecine des Enfants, Paris

42: 545-608 (Sept. 9) 1939

Arterial Hypertension in Children. R. Pierret and G. Lefebvre.—p. 545.
*Digital Mutilations in Infantile Acrodynia. J. Gadrat, J. Lasserre and R. Petel.—p. 559.
Evolutive and Occult Phases of Primary Tuberculosis in Children: A Cross Section. K. R. Anday.—p. 571.

Infantile Acrodynia with Gangrenous Mutilations.—According to Gadrat and his collaborators, the view long entertained of the benignancy of infantile acrodynia needs to be revised in the light of the investigations of the last fifteen years or more. They report two cases showing ulcerogangrenous complications of the extremities. The first case concerned an infant girl aged 23 months, of healthy parents and with no previous pathologic history. She had been hospitalized five months after the appearance of a general cutaneous eruption diagnosed as eczema and after the further progress of the disease had produced extreme pains, livid discoloration of the skin of the terminal finger bones and a dry gangrene that had necessitated amputation of the thumb of the left hand and implicated the loss of the third bone of the index finger. The clinical examination showed cyanotic, cold and sweaty feet and hands swollen to the wrists, the left hand enormously so, the stump of the index finger disclosing the bone and exhaling a nauseating odor. Treatment consisted of hot baths, local application of an ointment, daily injections of 0.0002 Gm. of acetylcholine and administration of two ampules of liquid liver extract and 0.05 Gm. of phenobarbital. This treatment was reinforced subsequently by ultraviolet irradiations and a vitamin D regimen. The authors' final report of the patient's condition, more than a year after inception of the infection, shows general excellent health, the right hand normal in appearance and size, the left hand well cicatrized but with only the fourth and little finger remaining and the fourth finger almost twice its normal size. The second case concerned a country girl of about 3½ years, of healthy parents. The child had had whooping cough and measles before the end of her second year, but with no complications. Two months before hospitalization she developed great pain in the extremities, swollen hands and feet, an oozing sweat and the loss of the terminal bone of the right fourth finger. Clinical examinations showed feet and hands enlarged, cold and sweaty, the fourth finger necrotic, and tachycardia with a rate as high as 160 per minute. Three days after hospitalization the child suddenly died. Necropsy revealed vasodilatation with intense congestion in all organs and a massive vacuolar degeneration of the cervicodorsal medulla resembling genuine syringomyelia. Interpreting the two cases in the light of the literature, the authors point out that infantile acrodynia complicated by gangrene and resulting in phalangeal mutilation is infrequent, that gangrenous acrodynia is not necessarily fatal and that the majority of serious mutilations occur in infants aged between 2 and 4 years. While gangrene constitutes a formidable complication of acrodynia, its prognosis does not depend directly on gangrenous manifestations. They attribute the disease to neurologic lesions without, however, being able to account satisfactorily for the modifications of the inferior cervical ganglion of the sympathetic nervous system. Acrodynia is probably due, in their opinion, to a neurotropic virus with a special affinity for neurovegetative centers and capable of causing medullar degeneration that may end in syringomyelic cavities.

Schweizer Archiv f. Neurologie u. Psychiatrie, Zurich

44: 1-208 (No. 1) 1939. Partial Index

The "Endless Analysis" of Freud. R. Markuszewicz.—p. 1.
Monoplegia of Fingers and Tactile Agnosia. L. Halpern.—p. 35.
*Alcohol Hallucinosis and Its Relation to Schizophrenia. K. Huber.—p. 43.
Psychoanalysis and Problems of Human Existence. A. Storch.—p. 102.
Relations Between Structural and Functional Differentiation of Nervous Centers and Tracts in Chicken Embryos. F. Visintini and Rita Levi-Montalcini.—p. 119.
Ossification of Choroid Plexuses. G. Will.—p. 151.

Alcohol Hallucinosis and Schizophrenia.—Huber investigated twenty cases of alcohol hallucinosis in order to determine whether and to what extent relations exist between alcohol hallucinosis and schizophrenia. In all of these patients the prolonged abuse of alcohol could be demonstrated, and in five the histories revealed alcoholism in the ascendency. Two patients presented in addition to the symptoms of alcohol hallucinosis

those of delirium tremens. In six of the patients who had had attacks of alcohol hallucinosis schizophrenia later developed, and in three other patients the hallucinosis had some schizophrenic aspects. With regard to one patient it could not be definitely decided whether in the last attack of hallucinosis a schizophrenic or a senile component was involved. The author says that it must be regarded as definitely established that the specific symptoms of hallucinosis, that is, the auditory hallucinations combined with anxiety, are the result of a direct or indirect alcohol intoxication, for in all these cases abuse of alcohol could be demonstrated and there were no cases of this type in the absence of the abuse of alcohol. In the concluding summary the author says that there are two forms of alcohol hallucinosis: a form in which only the alcoholic factor becomes manifest and which represents the acoustic counterpart of delirium tremens, and a form in which a schizophrenic factor is recognizable in addition to the alcoholic factor. The latter form becomes manifest in that the symptoms of hallucinosis assume a schizophrenic color, that is, either the characteristic symptoms of hallucinosis are based on a mode of experience otherwise characteristic for schizophrenia or a schizophrenic syndrome is added. This latter form frequently changes into schizophrenia. Whether alcohol hallucinosis is of purely alcoholic origin or whether it is a reaction that develops on the basis of a schizophrenic predisposition cannot be definitely decided. Meggendorfer's assumption that tendencies toward schizophrenia are the basis of alcohol hallucinosis seems plausible. On the other hand, it cannot be denied that alcohol hallucinosis represents an independent syndrome and that it may aid in making a latent schizophrenia manifest. This latter assumption seems to be corroborated by the fact that alcohol hallucinosis never develops in the course of an already manifest schizophrenia but always at its onset.

Chirurgia degli Organi di Movimento, Bologna

24: 485-588 (Aug.) 1939. Partial Index

Abnormalities and Fractures of Articular Processes of Lumbar Vertebra. C. de Marchi.—p. 485.
Fusion of Second and Third Cervical Vertebrae in Relation to Congenital Torticollis. L. Giuntini.—p. 519.
*Painful Hemisacralization: Pathogenesis, Diagnosis and Treatment. F. Stefani.—p. 565.

Painful Hemisacralization.—According to Stefani, pain in hemisacralization of the fifth lumbar vertebra is due to irritation of sensory osteoperiosteal sensory nervous fibers, without any nervous or radicular lesion. The sensory and motor innervation of the leg, lateral to pain, is normal in hemisacralization, whereas it is disturbed in pain of neuritic or radicular origin. The coexistence of x-ray abnormalities of the vertebra with a normal sensory and motor innervation of the leg indicates hemisacralization. The author proposes a procedure for testing the normality of innervation of the lateral leg. It consists of the administration of an injection of a small dose (not specified by the author) of an anesthetic in solution over the apex of the macro-apophysis, the presence of which is previously determined by x-ray examination of the sacrolumbar segment. The injection is made under radioscopic control, with a needle of about 8 or 10 cm. Diffusion of the anesthetic to nearby structures is avoided. Pain from hemisacralization disappears immediately after the injection. The leg regains function. Both pain and dysfunction of the leg return as soon as the effect of the anesthetic is over. Neither sensory nor motor disturbances appear in the leg in the course of or after the test (positive results from the procedure). Pain from sacralization complicated by either neuritis or radiculitis disappears after the anesthetic from the lumbosacral region and upper part of the leg, whereas it is not modified at the lower part of the leg (partial positive results from the procedure). Lumbosacral pain of either neuritic or radicular origin either is not modified or is slightly modified simultaneously with appearance of sensory and motor disturbances of the leg. According to the author the procedure is of value for the diagnosis of painful sacralization and also for deciding on the operation, which is resection of the macro-apophysis. Five cases are reported. Two patients recovered from the operation (resection of the macro-apophysis). There was one case of the mixed form and one each of rheumatic and spondylolisthesic lumbosacral pain.

Gazzetta degli Ospedali e delle Cliniche, Milan

60: 803-836 (Aug. 20-27) 1939

*Blood Transfusion in Treatment of Febrile Rheumatic Endocarditis. G. Rettanni.—p. 803.
Sclerogummatous Syphilis of Gastrocnemius Muscle: Case. B. Rossi. —p. 813.
Hordenine Sulfate in Treatment of Diarrhea. R. Traverso.—p. 818.

Blood Transfusion in Rheumatic Endocarditis.—Rettanni resorted to blood transfusion for ten patients suffering from febrile forms of rheumatic endocarditis. Administration of previous treatment with salicylates had controlled the articular symptoms in all cases without interfering, however, with the progress of the heart disease. The most acute symptoms were those given by the heart disorder, fever and anemia. The author administered 300 cc. of blood for each transfusion every other day until twelve transfusions had been given. In all cases the fever abated and later in the course of the treatment disappeared. The crasis of the blood and general and nutritional condition of the patients greatly improved. The cardiac condition had complete remission (up to clinical recovery) in six cases. Great improvement occurred in two. The treatment failed in two. The author believes that the results of blood transfusion in febrile forms of rheumatic endocarditis are due to several factors: the presence of antitoxic and anti-infectious substances in transfused blood and a special biologic effect of blood by which it stimulates the organic forces of defense against the condition.

Archivos de Pediatría del Uruguay, Montevideo

10: 445-508 (Aug.) 1939. Partial Index

*Pathology and Epidemiology of Salmonellosis in Infants. E. Hormaeche. —p. 445.
Nontuberculous Pulmonary Diseases in Infants with Congenital Syphilis: Case. J. R. Marcos and Sara Mendivil.—p. 463.

Salmonellosis in Infants.—Hormaeche studied, in the course of the last two summer seasons, more than 200 cases of salmonellosis in infants. He found that the infection is caused by salmonellas of the group of Salmonella enteritidis but that the clinical picture, evolution and epidemiology of the infection are different from those of food poisoning in adults. Salmonellosis in infants is not produced by intestinal absorption of salmonella from contaminated food. Contagion takes place from convalescent adults (who suffered from enteritis). It is highly contagious among infants. However, older children and adults cannot be infected through infants. It occurs more frequently in summer than in any other season of the year. In some cases it develops with primary intestinal and gastrointestinal disturbances of progressive evolution and different type and acuteness. In other cases the first symptoms show pharyngitis or rhinopharyngitis with fever in the course of which the intestinal and gastric symptoms appear. The enteritic pure forms evolute for two or four weeks with alternations of improvement and aggravation. The pharyngeal and rhinopharyngeal forms are frequently complicated by otitis media or meningitis and are grave. A salmonella of animal origin can be isolated from the pharyngeal (or rhinopharyngeal) exudates, the pus of otitis and the cerebrospinal fluid in meningitis. Septicemia may complicate the infection, the rate of mortality of which is high. According to the author the differences between the pathology and epidemiology of salmonellosis in infants and those of food poisoning in adults depend on the following factors: (1) the different sensitivity of infants and adults to the pathogenic action of salmonellas of animal origin, to which infants are highly sensitive, (2) the small number of organisms which are necessary to produce the infection in infants and (3) the pathogenic mechanism of salmonellosis in infants, which resembles that of salmonellosis in animals rather than that of food poisoning in adults. Both in infants and in animals salmonellosis is an infection, whereas food poisoning in adults is a toxicosis. Again, both in infants and in animals the infection may be primarily located in structures other than the gastrointestinal tract, which is the structure mainly involved in food poisoning. The author believes that bronchopneumonia in infants which develops in summer, when complicated by gastrointestinal disturbances, is a form of salmonellosis with primary involvement of the lung.

Revista Argentina de Cardiología, Buenos Aires

6: 73-136 (May-June) 1939. Partial Index

*Vitamin B_1 in Treatment of Nonanginous Precordial Pain. B. Moia and F. F. Batlle.—p. 73.
Descending Aorta in Roentgen Anteroposterior Position. B. Enquin and J. A. Aguirre.—p. 83.
Calcification of Aortic Valves. B. Moia and F. F. Batlle.—p. 108.

Vitamin B_1 in Nonanginous Precordial Pain.—Moia and Batlle say that there is a type of precordial (cardiothoracic) pain which has a different clinical picture and different pathogenesis from those of angina pectoris and pain from coronary occlusion. It may be either mild or acute and persistent or repeated but never paroxysmal or constant. It diffuses from the precordial region to the left pectoral region and radiates to the left arm. It may appear in persons having a normal cardiovascular apparatus or in patients with cardiovascular diseases. It develops predominantly in persons with nervous hyperexcitability. The authors, taking as a point of departure the beneficial effects of vitamin B_1 on painful symptoms which appear in certain nervous diseases, resorted to vitamin B_1 in the treatment of precordial pain in 100 cases. The cardiovascular apparatus of eighteen patients in the group was normal. Nine of the patients had neurocirculatory asthenia, seven had mitral stenosis and sixty-six had hypertension of various intensity, vascular sclerosis, coronary disorders and syphilitic aortitis. In all cases the condition dated from several years back and various treatments had previously failed. Vitamin B_1 treatment was administered every other day parenterally with the dose of 0.001 Gm. for each injection up to a total number of nine injections and in rare cases fifteen. The best results from the treatment were obtained in a group of seventy-eight patients which included persons with normal cardiovascular systems and those who were suffering from hypertension and vascular sclerosis (without involvement of the coronary arteries). Pain disappeared completely in forty cases and temporarily in thirty; in eight cases the treatment failed. In the group of sixteen cases of mitral stenosis or neurocirculatory asthenia, pain disappeared completely in five and temporarily in five; the treatment failed in six. Treatment failed in the six cases of vascular sclerosis with coronary involvement. In the cases in which pain disappeared the satisfactory results have lasted up to the present (fourteen months after discontinuance of the treatment).

Beiträge zur klinischen Chirurgie, Berlin

170: 1-190 (Aug. 26) 1939. Partial Index

So-Called Primary Ectopic Cancer. F. Feyrter.—p. 1.
Neurogenic Appendicitis as Partial Manifestation of Endocrine-Nervous Enteropathy. H. Bohn.—p. 24.
So-Called Achilles-Calcaneodynia and Achilles Bursitis. G. Büttner and A. Heidemann.—p. 43.
*Perforation of Gastroduodenal Ulceration Following Administration of Contrast Meal. G. Büttner and W. Fangerau.—p. 58.
Further Experience with Roentgen Demonstration of Parotid Gland. E. Simon.—p. 77.
Rheumatic Liver Cirrhosis. E. Volhard and R. Basler.—p. 88.
Healing of Cesarean Section Scar. J. Erbslöh.—p. 91.

Perforation of Gastroduodenal Ulcer.—A review of the literature suggests, according to Büttner and Fangerau, that most authors regard perforation in the course of an x-ray gastrointestinal study as a result of a combination of unfavorable factors, among which the administration of too large a quantity of the contrast meal and the diminished muscle tonus of a dilated stomach play the leading part. In the case described by the authors there existed a long standing duodenal ulceration with a high grade pyloric stenosis and dilatation of the stomach. Barium mixture was given on the first and on the third day of examination. Perforation took place one half day later. In addition to the pyloric stenosis the patient had, as a result of a previous operation for ileus, a double-flint anastomosis in the transverse colon. Inspissated barium partially obstructed the colonic anastomosis and aggravated the gastroduodenal distention. Animal experiments of Himmelmann and Paas demonstrated that the spilling of a contrast meal in the peritoneal cavity is much more dangerous than the spilling of the gastric contents. Necropsy in the authors' case revealed a diffuse, hemorrhagic, fibrinopurulent peritonitis. Almost all of their cases were duodenal ulcer perforations located close to the pylorus and causing partial obstruction. A simple closure of the perforation tended to increase the obstruction. The added gastro-enterostomy carried out in the friable ulcerated area did not always relieve the situation. It is for these reasons that the authors prefer to carry out a gastric resection provided the patient is in good condition and the perforation is an early one.

Deutsche medizinische Wochenschrift, Leipzig

65: 1297-1332 (Aug. 18) 1939. Partial Index

Insulin Therapy of Schizophrenia. C. H. Roggenbau.—p. 1297.
Therapeutic Applicability of Vitamin B_6. K. Wachholder.—p. 1299.
*Experimental Investigations on Serum Therapy of Poliomyelitis. E. Gildemeister.—p. 1305.
Aspects of Adie's Syndrome. P. Matzdorff.—p. 1307.
New Results of Research on Normal Morphology of Thymus. W. Weise.—p. 1310.
Otogenic Brain Abscess and Its Treatment. D. Kulenkampff.—p. 1311.
Clinical Aspects of Granulocytopenia. H. Geisler.—p. 1315.

Serum Therapy of Poliomyelitis.—Gildemeister says that in Germany the collection and preparation of convalescent serum for the treatment of poliomyelitis is arranged in such a way that serum is obtained only from those persons who have had the paralytic form of poliomyelitis. It is withdrawn at the earliest two months and at the latest ten years after the attack of the disease. The quality of these serums, that is, their content in virus-neutralizing protective substances, differs greatly, even though some equalization is produced by the mixture of several serums. Thus there are mixed serums with good and some with deficient antibody content. Moreover, Jensen and others detected in the course of recent years that in patients with the paralytic forms of poliomyelitis the formation of protective substances is much inferior to that which takes place in the nonparalytic and in the abortive forms. Moreover, it has been said that high antibody contents are encountered in persons from the environment of patients with poliomyelitis ard even in those who have had no contact with them. The author decided to verify these reports. He determined that storage for a year, provided of course the serum is kept under suitable conditions, does not noticeably impair the antibody content. The addition of the usual conserving substances was likewise found to be without effect on the antibody content. The author describes the method he employed in the examination of the virus-neutralizing power of four different groups of serums and then reports the results of his investigations. His neutralization tests demonstrated that only half of the convalescent serums from patients with paralytic or nonparalytic poliomyelitis or of the serums of persons from the environment of such patients contain noticeable quantities of protective substances, that serums from patients with nonparalytic forms of poliomyelitis had a higher therapeutic value than had the serums of patients with the paralytic forms, and that serums of persons from the surroundings of patients with poliomyelitis had the least protective value. Serums from the retroplacental blood of healthy women had a surprisingly high protective value. The author concludes that the serum from the meningitic forms without paralysis is best for the treatment of poliomyelitis. To be sure, it will be difficult, if not impossible, to secure adequate quantities of this serum, even aside from the unreliability of the diagnosis of the nonparalytic forms of poliomyelitis. This proves that it is necessary to continue the collection of convalescent serum from patients with the paralytic forms of poliomyelitis. However, serum from nonparalytic cases should be collected, so far as the diagnosis is certain. Only mixed serums should be used for treatment, since only mixture of a number of serums will insure the presence of protective substances.

65: 1333-1368 (Aug. 25) 1939. Partial Index

Dietetics and Its Tasks. S. Bommer.—p. 1333.
*Value of Intracutaneous Test with Indophenol in Estimating Vitamin C Supply. H. Beck and F. H. Krieger.—p. 1336.
Pregnancy and Carcinoma: Clinical Observations and Experimental Studies on Spontaneous and Inoculation Tumors. H. Bastz.—p. 1341.
Anthrax in Bulgaria and Its Treatment with Immune Serum. W. Batschwaroff.—p. 1343.
Vitamin B_1 and Leprosy. E. Gminder.—p. 1346.
Care of Stomatitis Ulcerosa by Alkalization. Johanna Wilhelmi.—p. 1351.

Intracutaneous Test for Vitamin C Supply.—After directing attention to the desirability of a reliable indicator of the adequacy of the vitamin C content of an organism, Beck and Krieger show that among the numerous methods which have been suggested for this purpose there are some which

determine the reduction capacity of the urine, others evaluate the vitamin C content of the blood and still others employ tolerance tests. These methods, although suitable for clinical use, have found little application in general practice. It seemed desirable to determine the adequacy of the vitamin C supply by means of a cutaneous test. The authors point out that Rotter employed for this purpose a wheal test with four hundredth normal dichlorphenolindophenol solution. The time required for the discoloration of this wheal indicates the degree of saturation of the tissues with vitamin C. The authors describe their own method of preparing the four hundredth normal dichlorphenolindophenol solution and then describe their experiences with this test on healthy persons as well as on patients in whom C hypovitaminosis was suspected. Their investigations with and without control by simultaneous tolerance tests indicated that this method is adequate for practical purposes. They found that the normal discoloration time of a wheal produced according to their technic is around ten minutes; the threshold value between the average and the inadequate vitamin C supply is between ten and twelve minutes. If the discoloration time is considerably longer, it indicates a vitamin C deficiency; if shorter it indicates saturation. Although the method can be used for practical purposes, it cannot replace the clinical scientific investigations, especially the tolerance test. In studies on the newborn and their mothers, the test disclosed a considerable degree of uniformity of the discoloration time.

Deutsche Zeitschrift für Nervenheilkunde, Berlin

148: 117-196 (Aug. 1) 1939

Myogram in Tabes Dorsalis and in Paralysis. H. Krämer and G. Schaltenbrand.—p. 117.
*Familial Amyotrophic Lateral Sclerosis. H. Curschmann.—p. 133.
Mixed Form of Myopathy, Myotonia, Myasthenia with Some Others, Partly Heredodegenerative Symptoms. H. K. G. Bartstra and R. Zijlstra.—p. 141.
*New Method of Convulsion Therapy: Electric Shock Therapy. G. Sogliani.—p. 159.
Pathogenesis of Wassermann Reaction in Cerebrospinal Fluid. H. Demme.—p. 169.

Familial Amyotrophic Lateral Sclerosis.—Curschmann reports the history of a womag, aged 74, who related that as a young girl she had had paresis and muscular dystrophy in the forearms. The increase in the muscular atrophies was extremely slow, so that until six years before he saw her the patient was able to work with her hands. Impairment of the ability to walk dated back only a few years. Severe degenerative muscular atrophy was noticeable particularly in the radial region, but the other muscles of the hand and arm also were involved. The electrical irritability was practically abolished in the atrophic muscles. The muscles of the shoulder and pelvic regions were unimpaired. The patient died of cardiac insufficiency, pyelocystitis and pneumonia. The microscopic examination of the spinal cord corroborated the diagnosis of progressive spinal muscular atrophy, although the expected degenerative changes in the lateral pyramidal tracts and in the anterior tracts could not be observed. This is surprising, since some of the symptoms indicated involvement of these tracts. Especially noteworthy are the early onset, the slow progress, the comparatively mild course, the predominant involvement of the radial region and the absence of the bulbar paralysis. However, of primary interest is the fact that the brother of the patient developed during his youth the same form of muscular atrophy in his arms and legs. The author is convinced that this is an example of progressive amyotrophic lateral sclerosis in two siblings. A review of the literature, especially that of recent years, revealed to the author that the familial occurrence of amyotrophic lateral sclerosis is not as rare as was formerly believed. Among others he cites Kalinowsky, who observed a mother with amyotrophic lateral sclerosis, whose two daughters had a bulbar paralytic syndrome with atrophy of the small manual muscles; Kreyenberg, who detected amyotrophic lateral sclerosis in three siblings; Montanaro and Lopez, who observed amyotrophic lateral sclerosis in a father and three sons, and several other authors who made similar observations. He thinks that in the future careful neurologic studies should be made on the members of the families of patients with spinal amyotrophy and with amyotrophic lateral sclerosis and that studies on twins should also give attention to this group of disorders.

Electric Shock Therapy for Schizophrenia.—In order to avoid some of the dangers of the treatment with metrazol and yet obtain its favorable therapeutic results, Sogliani tried electric shock therapy, which was first described by Cerletti and Bini. The apparatus which the author employs utilizes the available alternating current, which, by means of a transformer, is brought to the desired tension. The current is passed through the head of the patient by means of a hood with two metal electrodes, which are attached to the temples. The author kept the tension constantly at 110 volts and adjusted the main contact breaker in such a manner that not more than 400 milliamperes passed through. The time necessary for the production of the convulsive attack he determined in each case by first passing the current through for half a second and then, after an interval of from ten to fifteen seconds, he repeated the electrical discharge for a time sufficient to elicit the convulsion. The thus determined optimal length of time which each patient required for the passage of the current in order to elicit the convulsion was subsequently employed for the elicitation of all attacks. The majority of patients required from 0.7 to 0.8 second for the passage of the current. The convulsive attacks thus elicited by electric shock are similar to those elicited by metrazol, but there are also differences in that, after the passage of the current, loss of consciousness results at once and the patient stretches in clonic convulsion without the cry so often heard in the metrazol convulsion. Furthermore, even in the rare instances in which an interval elapses between the passage of the current and the convulsion, the patients do not show the expression of fright and terror with dilatation of the pupils and rigid stare which they do at the onset of the metrazol shock. Moreover, the state of excitation so frequently seen after the metrazol convulsion is absent after electric shock. The electric shock can be repeated without danger after a few minutes. When the patient is about regaining his consciousness, the current may be passed through again to elicit a new convulsion. In physically healthy subjects the author elicited four or five convulsions in this manner. He gives the electric shock treatment every second day. The total number of treatments required varies between five and thirty. The first favorable results are usually noticeable after from three to ten attacks or they entirely fail to develop. Nevertheless the author subjects every patient to at least twenty attacks and after a certain interval he begins a new series of treatments He reports the results he obtained with electric shock therapy of 100 patients. Of seventy-three patients with schizophrenia, fifteen were cured, three improved and fifty-five were not influenced. This shows that the percentage of cures did not exceed that of spontaneous regressions. However, the schizophrenic patients subjected to shock therapy belonged nearly all to that group of chronic patients who neither exhibited spontaneous regression nor had been improved by other methods of treatment. Of the twenty-seven patients with manic depressive psychosis, twenty-two could be discharged; that is, 81 per cent. This high percentage is even more impressive if the duration of the disease is taken into consideration, for among those who were cured there were several who had been institutionalized for several years. In view of this fact, the author recommends the use of electric shock therapy for old cases of depressive psychosis in which other therapeutic methods have failed.

Klinische Monatsbl. f. Augenheilkunde, Stuttgart

103: 145-272 (Aug.) 1939. Partial Index

Survey Over Operations for Cataract Done with New Technic During 1938. K. Lindner.—p. 156.
Peculiar Form of Lenticular Regeneration (Multiple Free Lentoid Formation) in Secondary Cataract in Family with Hereditary Perinuclear Cataract. F. Riedl.—p. 169.
Lamellar Cataract and Spasmophilia. E. Gscheidel.—p. 194.
Bilateral Gummatous Syphilis of Lacrimal Gland. F. W. Meyer.—p. 200.
*Corneal Ulcer and Prontosil (Sulfanilamide). Roggenkämper.—p. 211.
*Efficacy of Sulfanilamide in Gonorrheal Diseases of Eye. W. Kattiofsky.—p. 214.
Vitamin B_1 in Treatment of Hypovitaminosis. Ida Czukrász.—p. 221.

Corneal Ulcer and Sulfanilamide.—Roggenkämper says that for a period of six months he treated all cases of corneal ulcer with sulfanilamide. The substance was given internally and by subconjunctival injection, but the author did not neglect to employ also the former therapeutic measures, such as shock therapy in the form of intramuscular injections of milk and the customary local methods. Thus the subconjunctival injection

of sulfanilamide was an auxiliary measure in the twenty-six cases on which this report is based. In fifteen of the twenty-six cases there existed posttraumatic serpiginous ulcers of various ages and extension, and in nearly all of them hypopyon existed. In all these cases the therapeutic results were surprisingly favorable as regards rapidity of cure as well as the final results. Among these cases of serpiginous corneal ulcers there were some which at the time of hospitalization gave the impression that only splitting of the cornea would prevent a panophthalmia. However, treatment with sulfanilamide made this unnecessary. The delicacy of the resulting corneal scars and the visual acuity were surprising. This applies to new cases in which the ulcers yielded to from one to three injections as well as to old cases in which nearly all hope had been abandoned and in which from six to eight injections of 0.5 cc. each were necessary to produce epithelization. Surgical operations were unnecessary and the author regards this as an essential advantage of the sulfanilamide therapy. In the scrofulous and catarrhal ulcers of the cornea the effect of the subconjunctival injections of sulfanilamide was not as favorable as in the typical serpiginous traumatic ulcers, but even there a favorable effect could be noticed. It is possible that the bacterial superinfection of these ulcers was excluded by the sulfanilamide. Favorable effects of subconjunctival injections of sulfanilamide were observed also in two cases of persistent parenchymal infiltrations following erosions and in three cases of infected erosions. In superficial keratitis, however, no effect was noticeable. The author concludes that sulfanilamide is of great value in infectious corneal diseases and that in serpiginous ulcers it may make surgical operations superfluous.

Sulfanilamide in Gonorrheal Eye Diseases.—The favorable results obtained with sulfanilamide in cases of gonorrhea induced Kattiofsky to try this treatment in four cases of gonorrheal conjunctivitis of the newborn. Fearing the toxic effects of the oral administration of sulfanilamide, he decided to apply it locally in the form of an ointment. He found that the therapeutic results of the local administration of sulfanilamide were not better than those of the customary therapy. However, he cites investigators who observed favorable results from the oral administration of sulfanilamide in the gonorrheal conjunctivitis of the newborn. He further describes the clinical histories of two adults with gonorrheal eye diseases. Favorable results in both of them were obtained with the oral administration of sulfanilamide. The author concludes that the chemotherapy of gonorrheal eye diseases by means of sulfanilamides represents a valuable addition to the therapeutic possibilities in these disorders.

Münchener medizinische Wochenschrift, Munich

86: 1297-1336 (Aug. 25) 1939. Partial Index

Is Serum Effective in Diphtheria Gravissima? H. Müller and H. Seidlmayer.—p. 1297.
Poisoning with Thallium Dust. W. Schwartz.—p. 1299.
Prophylaxis and Therapy of B Hypovitaminoses by Means of Yeast Concentrates. F. Diehl.—p. 1301.
How to Manage War Neuroses in Future Wars. F. W. A. Weber.—p. 1305.
Lesions Caused by Indelible Pencils. W. Mühlbächer.—p. 1307.
Treatment of Epidermophytosis of Feet. P. Kissinger.—p. 1308.
*Clinical Aspects and Diagnosis of Chronic Traumatic Hernias of Diaphragm. H. Brandt.—p. 1312.

Traumatic Hernias of Diaphragm.—Brandt says that traumatic diaphragmatic hernia, that is, the displacement of abdominal viscera through an opening into the thoracic cavity, is usually a false hernia, because it is not surrounded by a hernial sac. Nevertheless, in case of tangential bullet wounds, true diaphragmatic hernias have been observed in that only the diaphragmatic pleura or only this pleura together with the musculotendinous tissue was injured, while the peritoneum was not opened. The clinical aspects of traumatic diaphragmatic hernias vary greatly. On the basis of material from the literature, the author differentiates two main groups, the acute and chronic diaphragmatic hernias. The acute traumatic hernias of the diaphragm he classifies into those with and without signs of incarceration. In this report he takes up the chronic traumatic hernias of the diaphragm. He gives detailed clinical histories of two cases. The first patient had sustained injuries in an automobile accident. With the exception of occasional drawing pains in the epigastric region after big meals, the patient felt well for more than a year after the accident. Then he developed acute symptoms. At first diaphragmatic hernia was not thought of because there had been no trauma in the thoracico-abdominal region. Finally the condition was diagnosed as gastric volvulus and an operation was performed. Two days later the patient died. The surgical observations and the necropsy indicated that the accident caused a tear in the diaphragm and that the prolapsing omentum became fixed by adhesions. The occasional symptoms may have been caused by dragging or temporary incarceration of the stomach in the tear. It is not probable that the stomach had been in the thoracic cavity uninterruptedly since the accident. The necropsy disclosed a diaphragmatic tear 8 cm. in length, and it is assumed that at the time at which the acute symptoms began a portion of the bloated stomach passed through the tear and, as a result of the suction exerted by the negative pressure in the thorax, the stomach was drawn more and more into the thorax and was incarcerated in the diaphragmatic slit. A spontaneous return of the stomach was made impossible because it had been turned in such a manner that the great curvature was located forward and above. The second patient had sustained an accident which had produced a pelvic fracture and internal injuries. Here again the trauma did not involve the thoracico-abdominal region directly. The operation disclosed a diaphragmatic opening the size of a fist through which parts of the stomach and of the intestine entered the pleural cavity. This patient had severe symptoms continuously. The author shows that the hernias of the two patients represent two different types of chronic traumatic diaphragmatic hernia. The first patient had that form which exists for a long time without disturbances but in which an incarceration may suddenly cause severe symptoms; the second patient had the form of chronic diaphragmatic hernia which constantly causes symptoms. In the conclusion the author stresses among other points that, even if a trauma did not directly involve the thoracico-abdominal region, the possibility of a diaphragmatic hernia should be thought of whenever the abdominal organs cause symptoms in these cases. It should also be considered that a symptom-free interval may exist between the injury and the appearance of signs of incarceration.

86: 1337-1372 (Sept. 1) 1939. Partial Index

Gangrene, Its Prodromes and Treatment. E. Seifert.—p. 1337.
*Clinical Study and Pathogenesis of Subarachnoid Hemorrhages. G. Landes.—p. 1340.
Afunction in Atrophic Gastritis. A. Mahla.—p. 1341.
Effect of Ephedrine on Muscle Activity. A. Szakall.—p. 1344.

Subarachnoid Hemorrhages.—According to Landes, the classic picture of what is generally designated as subarachnoid bleeding is characterized by violent cephalalgia, sudden loss of consciousness, physical collapse in apparent health, marked meningeal signs and the bloody appearance of the cerebrospinal fluid in lumbar puncture, together with a high frequency of mortality reported in earlier medical experience. On the basis of eight cases—there were six men and two women between the ages of 18 and 66, with seven cures after an average clinical management of five weeks (treatment not indicated) and one fatality—the author calls attention to the variableness of the characteristics, neurologic as well as clinical, in the symptomatology of this disease. Lumbar puncture, initially performed, yielded a sanguineous fluid with pressure as high as 400 mm. of water. In subsequent assays the fluid appeared clearly xanthochromic. Initial erythrocytic counts numbered uniformly from 40,000 to 50,000; after eight days erythrocytes were no longer discernible. No initial preponderance of leukocytes, a typical sign of hemorrhagic meningitis, was observed. However, in most cases, contrary to the literature, leukocytic calculation was essentially higher, amounting to from 600 to 11,000 leukocytes per cubic millimeter, and after a week and later still yielded from 60 to 80 per cubic millimeter. Carefully conducted bacteriologic investigations, extended to include detection of anaerobic agents, remained negative. In three cases albumin in the spinal fluid was out of proportion to the blood content. The sugar content was generally high and averaged 80 mg. per hundred cubic centimeters. Syphilis was clinically excluded. Psychologic changes observed in all cases ranged from initial states of confusion and disorientation as to time and place to

considerable disorders of the memory and the faculty of attentiveness and lasted in some cases as many as four months. Necropsy performed in the single fatal case revealed local softenings with red infarct in the right temporal lobe and perforation of the lateral ventricle, microscopy indicating a dense leukocytic barrier about the infarct. Etiologically considered, death in this case may be accounted for as due to serious vasomotor disturbances. In the analysis of the other cases, the author's conjecture ranges from an aneurysm at the base of the brain to a causative agent of more inflammatory nature. Long continuing mental disturbances may indicate encephalitic processes in which the soft meninges are involved. Genuine hemorrhagic meningitis is not assumed. The author inclines to regard subarachnoid bleeding as a syndrome rather than a disease entity with a uniform etiology.

Vestnik Khirurgii, Leningrad

57: 587-672 (June) 1939. Partial Index

Operative Intervention in Echinococcus Disease. M. A. Gropyanov.—p. 587.
*Operative Treatment of Congenital Cerebral Hernia. N. I. Sokolov.—p. 593.
Malignant Goiter. V. A. Kartavin.—p. 606.
Sympathectomy and Ramisectomy of Thoracic Portion of Sympathetic Trunk. S. S. Sharimanyan.—p. 614.
Chronic Appendicitis as Related to Gastric Duodenal Disorders. O. G. Plisan.—p. 616.

Congenital Cerebral Hernia.—Sokolov has reviewed all cases of congenital encephalocele reported by Russian surgeons. Of the 143 patients, 119 underwent an operation; of these forty-three died, the mortality rate being 36.1 per cent. Of the 107 patients with frontal ethmoid encephalocele thirty-six died (33.6 per cent); in three the results seem doubtful (2.8 per cent). Recovery was obtained in sixty-eight (63.6 per cent). The author reports eight cases observed by himself and offers his own hernia plastic technic. His conclusions are as follows: 1. The frontal ethmoid encephalocele is more common in the Soviet Republic, the occipital variety being rather rare. 2. Infants with frontal ethmoidal cerebral hernia display remarkable viability. 3. Infants with cystic encephalocele should be operated on at the earliest possible time, even during the very first days of life. In doubtful cases treatment may be postponed till the infant is a month old, but it should always be performed in the first year of life. 4. In cases of considerable bony defect the symptoms may seem grave, but they disappear after the plastic closure of the defect. 5. The inner opening of the bony canal in nasofrontal hernia has unequal axes, the transverse axis usually exceeding the rest; this is especially true in naso-ethmoid hernia. The shape of the inner opening of the bony canal approaches an oval, the edges being fairly even. 6. The author recommends one stage, external operation, the procedure for posterior orbital hernia being an exception to the rule. 7. In naso-ethmoid and nasofrontal encephalocele the closure of the inner opening of the canal with a bony graft inserted from the inside of the skull insures good results. The access to the inner opening is gained by means of mobilizing the anterosuperior and partly the lateral walls of the bony canal. A graft of a size exceeding that of the defect and completely covering it can be introduced into the cranial cavity without any difficulty, for which purpose the difference in the axes of the canal is made use of. 8. In the anterior orbital hernia the short narrow canal should be completely eliminated by the introduction of a pinlike cartilaginous graft. 9. The author believes a free bony autoplastic graft to be the best material for the closure of large defects in encephalocele, the cartilaginous autoplastic graft being the best in smaller defects.

Geneeskundig Tijdschr. v. Nederl.-Indië, Batavia

79: 1971-2032 (Aug. 8) 1939. Partial Index

Results of Supporting Local Therapy of Trachoma by Sulfanilamide and Anthiomaline (Antimony Preparation). J. Schwarz.—p. 1971.
*Eye Symptoms in Patients with Leiodystonia and Sprue: Akinephasopia. P. H. Pock-Steen.—p. 1986.
Lichen Scrofulosus. D. P. R. Keizer.—p. 2007.
Case of Pellagra Treated with Nicotinic Acid. Salekan.—p. 2013.

Eye Symptoms in Leiodystonia and Sprue.—Pock-Steen calls attention to eye symptoms that he observed in about 100 patients with leiodystonia, sprue and sprue-like disorders. The most noteworthy eye symptom was a reduced visual acuity during weak daylight, such as twilight and during inadequate artificial illumination. The author designates this symptom as twilight blindness or aknephascopia. The twilight blindness is due to a diminished susceptibility to the light waves. It differs in nature from the well known night blindness. It is not influenced by the administration of vitamin A, as is night blindness, but it is greatly ameliorated a few hours after the administration of approximately 1 mg. of riboflavin (vitamin B_2). Of 109 patients, sixty-seven stated without hesitation that their vision was greatly improved following the first injection of 1 mg. of riboflavin, whereas thirty-one were able to corroborate this only after a longer period. The remaining eleven patients observed only a slight improvement in their visual acuity. The author observed that the symptoms of twilight blindness were usually greater in those patients with sprue who had anomalies of refraction. In these cases the effect of riboflavin on the visual acuity was not always as favorable as in the cases of sprue without anomalies of refraction. Nevertheless even in these cases surprisingly favorable results were obtained. In this connection the author mentions a patient aged 64 who stated that in two years he was obliged to change his glasses three times for stronger ones, but after his sprue had been treated with injections of riboflavin he could return to the use of his first pair of glasses. The author thinks that the twilight blindness is a symptom of a general B_2 hypovitaminosis and the only one known that can be observed clinically. Other eye symptoms observed in sprue are mydriasis, conjunctival irritation, keratitis and disturbances of accommodation. The burning pains of conjunctivitis were also found to decrease after the administration of riboflavin. The author thinks that the eye symptoms of patients with sprue are partly the result of B_2 hypovitaminosis and partly the consequence of the histamine toxicosis prevalent in sprue.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

83: 4385-4492 (Sept. 9) 1939. Partial Index

Vomiting in Nurslings. C. H. Verboom.—p. 4387.
Influence of Epinephrine and Atropine on Development of Tumors Induced by Injections of 1-2-5-6 Dibenzanthracene in White Mice. A. M. Lorentz de Haas.—p. 4395.
*Syphilis Resistant to Therapy. M. Ruiter.—p. 4404.
Treatment of Migraine. C. T. van Valkenburg.—p. 4412.

Syphilis Resistant to Therapy.—Ruiter cites observations made in a small town in which no new cases of syphilis had been observed for a number of years. Then a primary infection was discovered in a prostitute coming from another town, and subsequently there was an epidemic of syphilis. This outbreak of syphilis was noteworthy because of the high percentage of cases that proved resistant to chemotherapy. The author describes the histories of eight patients, in six of whom there developed, in the course of their treatment, a resistance to chemotherapy. The majority of the patients whose syphilitic infection proved refractory to chemotherapy exhibited psoriasiform papules, one patient had a pustulous rash with distinct mucosal lesions, and in one patient with drug-resistant primary syphilis a malignant type of syphilis developed. In spite of florid skin lesions, the serologic reactions were often found negative. The author mentions the types of chemotherapeutic substances that were used, also the doses given and the intervals that elapsed between administrations. He shows that with the exception of the first patient, who proved resistant to neoarsphenamine and sodium arsphenamine but who showed some response to bismuth, all patients had a resistance to plurivalent therapy. The fact that two drug-resistant women who were treated with arsenicals during pregnancy gave birth to healthy children seems to indicate that an arsenicoresistant variant of Spirochaeta pallida could be excluded. Nevertheless, the author assumes that the spirochetes contributed to some extent to the high incidence of resistance to chemotherapy. In remarks about how the resistance to drugs can be counteracted in syphilitic patients, the author mentions E. Hoffmann's method and the "saturation" treatment of Schreus. Furthermore, in some cases changing of the preparations or strengthening general treatments might prove helpful. If the resistance is plurivalent or total, the author recommends a trial with fever therapy.

Acta Psychiatrica et Neurologica, Copenhagen

14: 1-394 (No. 1-2) 1939. Partial Index

*Studies on Intracranial Vascular Sounds. T. Dalsgaard-Nielsen.—p. 69.
Sciatica and Vasomotor Reactions. E. Eldblom.—p. 103.
*Diseases of Teeth and Maxillae as Cause of Trigeminal Neuralgia. M. Melchior.—p. 117.
Concept of Neuralgia and Nature of Neuralgias. F. Lindstedt.—p. 127.
Operative Treatment of Brachialgia. G. Wilsrg.—p. 153.
Multiple Lipomatosis in Combination with Neuralgic Symptoms. K. H. Kralbe.—p. 165.
New Palliative Operation in Cases of Inoperable Occlusion of the Sylvian Aqueduct. A. Torkildsen.—p. 221.
*Hereditary Diabetes Insipidus. M. Ellermann.—p. 233.
Treatment of Acute Poliomyelitis. K. Zeiner-Henriksen.—p. 249.
*Treatment of Acroparesthesia with Acetylcholine: Report of Twenty-One Cases. K. A. Ekbom.—p. 311.
Cervical Spondyloses: Their Clinical Aspects and Treatment. R. Forsberg.—p. 325.
Neurologic Symptoms Caused by So-Called Acute Porphyria. J. Waldenström.—p. 375.

Intracranial Vascular Sounds.—Dalsgaard-Nielsen asserts that in children a physiologic intracranial vascular sound of venous character is frequently audible until the fontanel has closed but that in older children and in adults no such sound can be heard. However, a pathologic intracranial vascular sound of arterial character is heard in some of the cases of vascular tumor, especially arteriovenous aneurysm. This sound is quite different from the physiologic sound. The abnormal intracranial sound is not pathognomonic for vascular tumor, as it is found also in cases of hypertension and hydrocephalus resulting from a tumor of the fourth ventricle or inflammatory stenosis of the aqueduct, also in children with heart lesions. There is no difference as to character, localization and reaction to carotid compression in the vascular sounds heard in the presence of vascular tumors and in the pathologic vascular sounds of other intracranial origin. The circulatory disturbance underlying this intracranial vascular sound does not influence the electroencephalogram.

Diseases of Teeth and Maxillae as Cause of Trigeminal Neuralgia.—Melchior maintains that a number of factors play a part in the pathogenesis of trigeminal neuralgia, which are given too little attention by physicians as well as dentists. He refers to certain diseases of the dental system and to maxillary inflammations connected with them and says that in his experience they play an important part among the peripheral causes of trigeminal neuralgia. As regards the dental system, the disorders in question are diseases of the pulpa and of the peridentium, particularly the severe forms of gangrenous pulpitis, gangrene of the pulpa under fillings and dental granuloma with osteitis. The author puts especial stress on the late sequels of tooth extraction. Pieces of the root or sequesters frequently remain, which may heal into the jaw without giving rise to symptoms but which after many years may be the concealed cause of severe neuralgias. Moreover, extraction may elicit amputation neuromas, thin ridges of bone and alveolar fractures often combined with dislocation of the fragments, which after treatment protrude in the form of sharp bony edges and cut into the mucosa, which, tense and adherent, is thus exposed to chronic trauma. In this connection the author cites the case of a man aged 50 who for six years had suffered from severe neuralgia of the second branch of the trigeminus. It was found that a fragment of bone had been turned outward toward the mucosa and was incarcerated in a fracture cleft. The removal of this piece of bone and of the adjoining alveolar edges was followed by cure. After citing another case of trigeminal neuralgia which resulted from a fracture of the superior maxilla and which subsided after removal of a ridge of bone, the author points out that chronic traumas as well as pressure and traction on the nerves of the peridentium may cause neuralgia, for instance in persons with difficult perforation of the teeth, particularly the lower wisdom teeth. Retention of teeth also deserves attention in this connection. In the second part of his paper the author takes up the chronic forms of maxillitis, which may give rise to trigeminal neuralgia. He shows that carious teeth may cause infection and inflammation in the surrounding bone tissues. These processes are, as a rule, of the same character as the chronic peridentitis; that is, they are either of a hyperplastic or of a destructive nature. Observations extending over a number of years convinced the author that these chronic osteitides may be the hidden peripheral cause of severe trigeminal neuralgia. Their pathologic anatomy as well as their symptomatology varies greatly. The author reviews a case which he had described under the heading of "toothache in persons without teeth" and which concerned a patient with sclerosing hyperplastic osteitis. Further, he directs attention to cases of paradental, destructive, rarefying, chronic osteitis in which irregular hollow spaces are gradually produced in the spongiosa of the maxilla. In cases of this type fistulas exist, but there is also a nonfistulous form in which closed spaces with flaccid granulation tissue are observed. Finally there is a diffuse form with osteoporosis. In nearly all these forms of severe maxillary osteitis neuralgias exist that prove refractory to all treatment. The diagnosis requires a competent and thorough examination of the teeth and jaws. The best method of treatment is the removal of the diseased bone tissue.

Hereditary Diabetes Insipidus.—Ellermann was consulted by a man aged 23 who had had diabetes insipidus since childhood. The man explained that a brother as well as his father and grandfather also had diabetes insipidus. Further inquiry revealed that the members of this family had been studied by Lauritzen in 1893, when it was discovered that nine of fifteen members had diabetes insipidus. In 1938 this family had seventy-three members, of whom twenty-six were found to have diabetes insipidus. After citing other reports on the heredity of diabetes insipidus from the literature, the author discusses the quantity of polyuria and polydipsia in patients with this disorder. His records indicate that the majority of patients with diabetes insipidus had a daily diuresis of from 12 to 16 liters, while in others it was less severe, amounting to 9, 6, 5 or 4 liters. That the diuresis may be quite severe during childhood the author proves by citing the history of a boy aged 9 in whom the daily diuresis reached 18.5 liters. He further directs attention to the increase in the diuresis during the pregnancy of women with diabetes insipidus. In one woman with diabetes insipidus, who gave birth eight times, the diuresis increased during each pregnancy from around 10 to approximately 20 liters daily and during her seventh pregnancy the daily quantity of urine reached 30 liters. In some cases of diabetes insipidus, neurologic examination failed to detect any abnormality. Roentgenoscopy of the cranium in three cases of diabetes insipidus failed to disclose pathologic aspects, especially in the sella turcica. Spinal puncture, which was performed twice in one case, produced entirely normal results. Regarding the treatment the author says that the restriction of the salt intake produces no results whatever and that the only effective agent is solution of posterior pituitary. The mode of hereditary transmission of diabetes insipidus seems to be one of simple dominance.

Treatment of Acroparesthesia with Acetylcholine.—Ekbom applies the term acroparesthesia to the characteristic clinical picture to which Schultze first applied it. He does not include in this term the paresthesias of the peripheral parts of the body, which may occur in diseases such as pernicious anemia, polyneuritis, tabes, syringomyelia, multiple sclerosis and tetany. He does not discuss the entire symptomatology but directs attention to a symptom which apparently has been overlooked heretofore, namely a reduction in muscular strength. Tests with the dynamometer revealed reduced values in the majority of the cases examined and in none of the cases were the dynamometric values entirely normal. The author lists a number of methods that have been recommended for the treatment of acroparesthesia and says that the multiplicity of the suggested methods indicates that none of them are entirely satisfactory. Occasionally, rest alone seems to have a good effect and this must be taken into account in the evaluation of the effect of a given therapeutic agent on acroparesthesia. Reasoning that the choline derivatives with their vasodilatory action might be of value in acroparesthesia, the author decided to try acetylcholine. As a rule one ampule of 0.1 Gm. was given each day but sometimes every second day. Occasionally the dose was increased to 0.2 Gm. On the average, ten injections were given, sometimes a few more and sometimes a few less. Some patients were given also an acetylcholine suppository of 0.3 Gm. in the evening. The injections were given intramuscularly. The author employed the injections of acetylcholine in twenty-one cases of severe acroparesthesia, with no improvement in three, moderate improvement in five and considerable improvement in thirteen. Of the thirteen with considerable improvement, no other treatment was given in eight, while rest

had been prescribed in five. Recurrences sometimes appeared fairly soon, but generally the improvement lasted for several months after the treatment. The results were encouraging and the method is recommended for further trial.

Acta Tuberculosea Scandinavica, Copenhagen

13: 193-424 (No. 3-4) 1939. Partial Index

Allergy and Immunity (Iathergy) in Experimental Tuberculosis: IV. Degree of Tuberculosis in Guinea Pigs Prevented from Becoming Tuberculin Hypersensitive. K. Birkhaug.—p. 221.
*Saprophytic Acid-Fast Bacilli as Source of Error in Diagnostic Work. Vera Lester.—p. 251.
Experiences and Results of Phrenic Nerve Operations Performed After Certain Periods of Observation. B. Nordgren.—p. 286.
Housing Conditions Among Tuberculous Patients in Oslo. A. Strøm. —p. 301.
Deaths Due to Angina and Granulocytopenia Following Treatment with Sanocrysin. K. Søndergaard.—p. 318.
Experimental Investigations Concerning Question of Division of Adhesions by Diathermy or Galvanocautery. K. S. Stein.—p. 350.
*Tuberculous Lower Lobe Cavity. K. Törning and A. Springborg.—p. 366.

Acid-Fast Bacilli as Source of Error.—Lester points out that the acid-fast saprophytes deserve attention because they belong to the myobacteria and are closely related to the tubercle bacilli. She decided to determine the frequency of occurrence of acid-fast saprophytes in the specimens submitted for bacteriologic diagnosis. During the five years from 1932 to 1936 inclusive, 26,343 specimens were examined at the tuberculosis department of the State Serum Institute of Copenhagen and 130 acid-fast saprophytic bacilli were isolated. An increase in the number of acid-fast saprophytes was seen following two improvements in the technic: the change from Petroff's medium to an egg asparagin medium containing 0.75 per cent of glycerol and the replacement of sodium hydroxide by 6 per cent of sulfuric acid for homogenization. The author describes the methods that are used for differentiating saprophytic acid-fast bacilli from tubercle bacilli and shows that three procedures proved valuable: (1) prolonged observation of the primary culture, (2) subculture on solid egg medium and in Besredka's fluid medium and (3) intracutaneous inoculation into guinea-pigs. Some strains of special interest are described in detail. No attempts are made to classify the acid-fast saprophytic bacilli, as no adequate serologic or biochemical methods are as yet available. In fifty-five of the 130 strains the colonies had a bright orange color. It is not possible to determine if they form a group apart, but these strains seem at least to have some features in common. None of the 130 strains were pathogenic for guinea pigs in the doses used, but the most dysgonic of those growing in orange-colored colonies produced small abscesses following intracutaneous injections. No propagation was seen, and the abscesses healed spontaneously in a few weeks. Some of those strains were examined by injection of higher doses into guinea pigs and rabbits, but only local regressive lesions were seen. One avian tubercle bacillus was included in the material. Culturally it showed some resemblance to the dysgonic chromogenic saprophytes, but, by virulence tests in guinea pigs and rabbits, it was classified as a typical avian tubercle bacillus. Only about one fifth of the strains observed by the author resembled the eugonic, more or less pigmented cultures most often described in the older literature as acid-fast saprophytic bacilli. The source of the saprophytes found in cultures from human material could not be determined. In some cases it seemed probable that the saprophytes were brought into the specimens at the hospital, in a few other cases the laboratory had to be suspected. The author emphasizes that in diagnostic work it should always be remembered that many of the acid-fast saprophytes greatly resemble atypical tubercle bacilli, which, however, are rare. A strain that cannot be definitely identified as a human or bovine tubercle bacillus should not be discarded until it has been thoroughly examined by cultural and animal tests.

Tuberculous Cavity of Lower Lobe.—Törning and Springborg show that when the treatment is to be selected not only the size and the pathologic-anatomic character of a tuberculous cavity but also its localization must be considered. In view of the fact that roentgen examination is generally limited to one plane, the frontal, it has been possible to localize the cavity only in this one plane. The current terminology shows that this limitation has been forgotten, for most of what has been written of "central" cavities is based on the observation of cavities which in the frontal pictures were located medially, near the hilus, while they might very well have been peripheral, situated immediately beneath the anterior or posterior surface of the lung. A more precise localization of the cavity requires roentgen study in several planes. In this paper the authors give an account of cases that met two requirements: (1) There was a cavity measuring at least 2 cm. in diameter and located below the level of the pulmonary artery at the hilus of the lung; (2) the pulmonary lesion was entirely unilateral and apart from the cavity there was nothing pathologic in the lungs (nineteen cases) or merely small, sharply defined shadows that could be interpreted as signs of a healing process (two cases). The authors give brief histories of these twenty-one cases and indicate in sketches the localization and the size of the cavities. In fourteen of the twenty-one cases in which the solitary cavity below the level of the pulmonary artery could be located exactly, it was situated posteriorly in the lower lobe. The juxtahilar ("central") cavities, four altogether, were all markedly peripheral, situated posteriorly in the lung. Of seventeen patients treated with pneumothorax an adhesion-free pneumothorax was obtained primarily in nine and after cauterization in four. These patients are all well. Of three patients with noncauterized adhesions to the area of the cavity, two died. Whenever an adhesion-free pneumothorax was obtained the results were just as good in patients with large cavities as in those with small cavities. When there is a solitary cavity and the process of infiltration is limited to the circumference of the cavity, if active treatment seems indicated, it should always commence with an attempt at pneumothorax, regardless of the location and size of the cavity.

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*Aneurysms of Brain. E. Hval.—p. 2626.
Duration of Confinement to Bed after Operations. N. Bacher-Grøndahl. —p. 2630.
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Aneurysms in Brain.—Hval cites Rømcke and Ustvedt, who report from Ullevaal Hospital that subarachnoid hemorrhages occur in one of every twenty-nine apoplexies and that of their twenty-seven cases fourteen involved persons under 50 and eight persons under 30. A large number of such hemorrhages, Hval says, are due to rupture of aneurysms at the base of the brain. The aneurysms are usually of the size of a pea or smaller; careful examination is necessary to establish them. Since subarachnoid hemorrhages often lead to death in apparently well persons in the prime of life they are important in medicolegal cases, and traumatic aneurysms are of special interest. In the first of the five cases of subarachnoid hemorrhages described, in a man aged 23 who died sixteen days after trauma of the head, necropsy showed unusual and marked changes in the vertebral artery, together with a process undergoing organization and the development of a pseudoaneurysm at the site of the rupture. If the fatal hemorrhage had not occurred, a permanent aneurysm would probably have resulted ("traumatic aneurysm"), although the vascular changes were of primary importance. In the other cases pea-sized aneurysms had ruptured. In one case the aneurysm was in the middle cerebral artery and due to arteriosclerosis; in one case in the anterior cerebral artery, with degenerative changes in the vascular wall and calcifications in the internal elastic membrane, and in two cases in the inferior posterior cerebellar and the left posterior cerebral artery, respectively, with syphilitic endarteritis and leptomeningitis and calcifications. In the sixth case presented, sudden death occurred after a cerebral tumor probably in the hypophysis had been suspected. An aneurysm the size of a pigeon's egg was found in the circle of Willis adherent to the optic chiasm and extending from the right posterior communicating artery. The ventricle system was filled with blood. There were no signs of arteriosclerosis or degenerative changes in the blood vessels, and congenital origin of the aneurysm is thought possible.